UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to NMFS No.:
2005/03253

August 19, 2005

Mr. Sean Sheldrake
U.S. Environmental Protection Agency
Environmental Cleanup Office
1200 Sixth Avenue
Mailstop: ECL-110
Seattle, Washington 98101-1128

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation for the Northwest Natural Removal Action at the Gasco Site, Portland Harbor, Willamette River, Multnomah County, Oregon

Dear Mr. Sheldrake:

The enclosed document contains a biological and conference opinion (Opinion) prepared by the National Marine Fisheries Service (NMFS) pursuant to Section 7(a)(2) of the Endangered Species Act (ESA) on the effects of Northwest Natural's Removal Action at the Gasco Site, as authorized by the U.S. Environmental Protection Agency (EPA) under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund. In this Opinion, NMFS concludes that the proposed action is not likely to jeopardize the continued existence of thirteen species of ESA-listed salmonids: Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tschawytsha*), Upper Willamette River (UWR) spring-run Chinook salmon, Columbia River (CR) chum salmon (*O. keta*), LCR steelhead (*O. mykiss*), UWR steelhead, LCR coho salmon (*O. kisutch*), Upper Columbia River (UCR) Chinook salmon, Snake River (SR) spring/summer Chinook salmon, SR fall Chinook salmon, UCR steelhead, Middle Columbia River steelhead, Snake River Basin steelhead, and SR sockeye salmon (*O. nerka*). Further, NMFS concludes that the proposed action is not likely to result in the destruction or adverse modification of critical habitat designated for the affected evolutionarily significant units except LCR coho salmon, for which critical habitat has not been proposed or designated.

As required by Section 7 of the ESA, an incidental take statement prepared by NMFS is provided with the Opinion. The incidental take statement describes reasonable and prudent measures NMFS considers necessary or appropriate to minimize incidental take associated with this action. It also sets forth nondiscretionary terms and conditions, including reporting requirements, that the Federal agency and applicant must comply with to carry out the reasonable and prudent measures. Incidental take from actions by the action agency and applicant that meet these terms and conditions will be exempt from the ESA take prohibition.

This document also includes the results of our consultation regarding the action's likely effects on essential fish habitats (EFH) pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), and includes eight conservation recommendations that are a subset of the terms and conditions included in the ESA portion of the document, and are intended to avoid, minimize, or otherwise offset potential adverse effects to EFH. Section 305(b)(4)(B) of the MSA requires Federal agencies to provide a detailed written response to NMFS within 30 days after receiving these recommendations. If the response is inconsistent with the recommendations, the EPA must explain why the recommendations will not be followed, including the justification for any disagreements over the effects of the action and the recommendations.

If you have questions regarding this consultation or need to request confirmation of a conference as a biological opinion, please contact Dr. Nancy Munn in the Willamette Basin Habitat Branch of the Oregon State Habitat Office at 503-231-6269.

Sincerely,

for Michael R Crouse

D. Robert Lohn
Regional Administrator

cc: Jeremy Buck, USFWS
Greg Smith, USFWS
Robert Neely, NOAA
Christine Svetkovich, ODEQ

Endangered Species Act-Section 7 Consultation
Biological Opinion

&

Magnuson-Stevens Fishery Conservation and Management Act
Essential Fish Habitat Consultation

Northwest Natural Removal Action at the Gasco Site, Portland Harbor,
Willamette River, Multnomah County, Oregon

Lead Action Agency: U.S. Environmental Protection Agency

Consultation Conducted By: National Marine Fisheries Service
Northwest Region

Date Issued: August 19, 2005

Issued by: For Michael R Crouse

D. Robert Lohn
Regional Administrator

NMFS No.: **2005/03253**

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INTRODUCTION

The biological and conference opinion (Opinion) and incidental take statement portions of this consultation were prepared by the National Marine Fisheries Service in accordance with Section 7(b) of the Endangered Species Act (ESA) of 1973, as amended (16 USC 1531, *et seq*.), and implementing regulations at 50 CFR 402. With respect to critical habitat, the following analysis relied only on the statutory provisions of the ESA, and not on the regulatory definition of "destruction or adverse modification" at 50 CFR 402.02.

The essential fish habitat (EFH) consultation was prepared in accordance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 USC 1801, *et seq*.) and implementing regulations at 50 CFR 600. The administrative record for this consultation is on file at the Oregon State Habitat Office.

Background and Consultation History

On May 9, 2005, NMFS received an email from the U.S. Environmental Protection Agency (EPA) requesting initiation of formal consultation under the ESA and EFH consultation under the MSA. The NMFS received a biological assessment (BA) on May 19, 2005. The NMFS requested additional information on June 27, 2005, and a response was received on June 28, 2005. Northwest (NW) Natural proposes to conduct a sediment removal action at the Gasco Site within the lower Willamette River, as authorized by the EPA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund. Formal consultation was initiated June 28, 2005.

The BA concluded that the proposed project was "likely to adversely affect" Lower Columbia River (LCR) Chinook salmon (*Oncorhynchus tshawytscha*), Upper Willamette River (UWR) spring-run Chinook salmon, Columbia River (CR) chum salmon (*O. keta*), LCR steelhead (*O. mykiss*), UWR steelhead, and LCR coho salmon (*O. kisutch*). The BA also concluded that the proposed project "may adversely affect" EFH for Chinook salmon, coho salmon, and starry flounder (*Platyichthys stellatus*). The BA also concluded that the proposed action may affect critical habitat.

References for listing status and dates, ESA Section 4(d) take prohibitions, and proposed critical habitat designations are provided in Table 1. This Opinion is based on the information presented in the BA, and information provided during meetings and site visits with the Corps and the applicant. The objective of this Opinion is to determine whether EPA's authorization of NW Natural's removal of tar and contaminated sediment in the Willamette River is likely to jeopardize the continued existence of the ESA-listed species described in Table 1 or result in the destruction or adverse modification of designated critical habitat.

Table 1. Federal Register Notices for Final Rules that list species, designate critical habitat, or apply protective regulations to ESUs considered in this consultation

(Listing status: 'T' means listed as threatened under the ESA; 'E' means listed as endangered; 'P' means proposed for listing; and 'D' means that the final listing determination is deferred until December 28, 2005. See also, proposed listing determinations for 27 ESUs of West Coast salmonids, at 69 FR 33102, 6/14/04; and proposed designation of critical habitat for 13 ESUs of Pacific salmon and steelhead and proposed protective regulations at 69 FR 74572, 12/14/04.)

Species ESU	Listing Status	Critical Habitat	Protective Regulations
Chinook salmon (*Oncorhynchus tshawytscha*)			
Lower Columbia River	T 6/28/05; 70 FR 37160	Final rule pending publication	6/28/05; 70 FR 37160
Upper Willamette River spring-run	T 6/28/05; 70 FR 37160	Final rule pending publication	6/28/05; 70 FR 37160
Upper Columbia River spring-run	E 6/28/05; 70 FR 37160	Final rule pending publication	ESA Section 9 applies
Snake River spring/summer run	T 6/28/05; 70 FR 37160	10/25/99; 64 FR 57399	6/28/05; 70 FR 37160
Snake River fall-run	T 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	6/28/05; 70 FR 37160
Chum salmon (*O. keta*)			
Columbia River	T 6/28/05; 70 FR 37160	Final rule pending publication	6/28/05; 70 FR 37160
Coho salmon (*O. kisutch*)			
Lower Columbia River	T 6/28/05; 70 FR 37160	Not applicable	6/28/05; 70 FR 37160
Sockeye salmon (*O. nerka*)			
Snake River	E 6/28/05; 70 FR 37160	12/28/93; 58 FR 68543	ESA Section 9 applies
Steelhead (*O. mykiss*)			
Lower Columbia River	T 3/19/98; 63 FR 13347 D 6/28/05; 70 FR 37160	Final rule pending publication	7/10/00; 65 FR 42422
Upper Willamette River	T 3/25/99; 64 FR 14517 D 6/28/05; 70 FR 37160	Final rule pending publication	7/10/00; 65 FR 42422
Middle Columbia River	T 3/25/99; 64 FR 14517 D 6/28/05; 70 FR 37160	Final rule pending publication	7/10/00; 65 FR 42422
Upper Columbia River	E 8/18/97; 62 FR 43937 D 6/28/05; 70 FR 37160	Final rule pending publication	ESA Section 9 applies
Snake River Basin	T 8/18/97; 62 FR 43937 D 6/28/05; 70 FR 37160	Final rule pending publication	7/10/00; 65 FR 42422

Proposed Action

For purposes of this consultation, the proposed action includes all methods and actions described in the following paragraphs. On April 28, 2004, EPA signed an Administrative Order on Consent (AOC) agreed to by NW Natural. The AOC requires that NW Natural perform a number of activities associated with a removal action for the tar body present on the surface of a portion of the sediments at the Gasco Site. The Gasco Site is within the boundaries of the Initial Study Area of the Portland Harbor Superfund site. The Portland Harbor Superfund site was listed on the National Priorities List, pursuant to Section 105 of CERCLA, 42 USC § 9605, on December 1, 2000.

The Gasco Site is approximately 35 acres and is a former gasification and oil-tar distillation plant in Portland, Oregon. The upland portion of the site is bounded by the Willamette River at river mile (RM) 6 and State Highway 30. The site is beside the Wacker Siltronic and U.S. Army Corps of Engineers U.S. Moorings facilities.

The site is currently owned by the NW Natural Gas Company, which is the assumed name of the Portland Gas and Coke Company (Gasco). It is currently used as a liquefied natural gas plant. Gasco purchased the site in approximately 1910. Gasco built and operated an oil gasification plant on the site between 1913 and 1956. Between 1913 and 1923, only gas and lampblack briquettes were produced. In 1923, Gasco began refining the byproducts. After 1925, when tar refining operations began, the quantity of tar within the waste stream would have decreased, but waste tar in the effluent continued as suspended material and emulsions from the secondary tar box. Before 1941, all wastewater effluent and tar stills from the gasification process and by-product refining were discharged to a stream channel leading from the production area to the Willamette River, or to low areas of the site. After 1941, wastewater effluent and tar still were disposed of in settling ponds on the northern portion of the site. When the plant was shut down in 1956, an estimated 30,000 cubic yards of tar waste had accumulated in the ponds. The tar ponds were buried under 10 feet of fill in 1973.

Other than as a liquefied natural gas plant, the current uses of the Gasco Site are bulk transfer of creosote oil and coal tar pitch, liquefied gas storage and bulk petroleum storage.

A number of remedial investigations (RI) and risk assessment activities have been completed at the site pursuant to the Oregon Hazardous Cleanup program and under a voluntary agreement with the Oregon Department of Environmental Quality (DEQ). The first phase of the RI identified widespread oil gasification and by-products refining waste in the site soils, groundwater, and Willamette River sediments. Tars were identified to depths of 70 feet in the area of the former tar waste disposal area. In the former plant site area, dense non-aqueous-phase liquids (DNAPLs) were identified at three locations. In subsequent RI phases, monitoring wells were installed beside the Willamette River, and these detected elevated concentrations of benzene and naphthalene. Sediment samples contained high concentrations of polycyclic aromatic hydrocarbons (PAHs), and pure tar waste extending from the site to the river was confirmed. Groundwater contamination was detected up to 100 feet below the surface along the riverbank.

Project Design

The Gasco Site is within the Portland Harbor Superfund Site in the lower Willamette River. DEQ is leading the RI for the upland portion of the Harbor cleanup to determine whether there is an ongoing source of contamination to the in-water area. EPA is leading the RI for the in-water portion of the Harbor clean-up to evaluate contaminants in the sediment. EPA has been working with NW Natural to determine the nature and extent of contamination in the sediments at the Gasco Site. The proposed action is considered an 'early action' because it is being conducted before the RI and the record of decision (ROD) are completed for the site. Therefore, it is not considered the final cleanup remedy.

The focus of this removal action is the riverbank and bottom containing observable black tar waste and contaminated sediments with the highest levels of total PAHs. The tar body is the greatest threat to the environment at the site, and a potential continuing source of releases to the river. The primary hazardous substances, pollutants or contaminants associated with this tar body are PAHs, benzene, naphthalene, toluene, ethylbenzene, and xylenes (BTEX), and cyanide. Metals, semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs) have also been detected, but have generally been observed at lower concentrations as compared to the primary contaminants above.

EPA proposes to remove approximately 15,000 cubic yards (cy) of the tar body and visually contaminated sediments. The tar body is not homogeneous, but contains a variety of physical characteristics, including: (1) Thin tar laminations bounded by sediments; (2) lenses of tar; (3) soft, sticky masses of tar; and (4) dense brittle fragments of tar containing little or no sediments. The visually-contaminated sediments underlay the tar body and include everything from heavily saturated sediments with dense, sticky, non-flowing oil to sediments with a slight sheen.

The applicant proposes to remove the tar body and visually-contaminated sediments from a dredge prism, and place a clean sand temporary cap (pilot cap) on the dredged surface. There are seven components to this action: (1) Containment, (2) dredging, (3) transport, (4) disposal, (5) capping, (6) project timing, and (7) monitoring and conservation measures.

Containment. The contractor will deploy a multiple layer system of containment to limit the movement of contaminated sediments from the removal area and to deter fish movement into the area. Two different containment systems will be built: one for the dredging along the inner shoreline, and one along the outer channel area. However, both systems will use the following:

1. Inner floating oil absorbent booms.
2. Silt curtain system to contain suspended sediments.
3. Bedload baffle to contain potential residuals along the river bottom.
4. Bubble curtain to deter fish movement into the area.
5. Outer oil containment boom with an absorbent pad at the surface and a skirt extending two feet below the water surface to contain buoyant substances.

The dredging in the inner area will be conducted within a full length silt curtain that is anchored approximately flush with the mudline. When the outer area is being dredged, silt curtains will extend to the bottom except in the channel portion where silt curtains would extend within 2 feet of the channel bottom. The bedload baffle will be installed on the bottom and beside the silt curtain; it will extend 6 feet up from the mudline. This will allow for a 6-foot overlap between the silt curtain and the bedload baffle in the channel area.

The dredging in the inner shoreward area will be completed first, followed by dredging in the outer channel area. After installation of the containment system, the applicant will capture and remove fish from within the containment area with seines.

The containment system will rely on two methods of monitoring to ensure it is being properly implemented. The first method is daily visual inspections, including the occasional use of divers. The second method is water quality monitoring to ensure that sediment plumes do not extend beyond the containment. The turnaround time for laboratory analyses will be 72 hours. River velocity measurements will also be taken to ensure velocities do not exceed the threshold (one foot per second) where the containment may be compromised.

For dredging in the inner area, the material may be loaded onto a haul barge across the containment barrier, or alternately, the haul barges may be moved through a door in the silt curtain that can be temporarily opened. A third option is that the inner containment barrier will not have a door, and an extra dredge and haul barge will offload the material from the inner haul barge to a transport haul barge outside of the inner primary containment. A separate silt curtain, bedload baffle curtain, oil boom, and bubble curtain will contain the off-loading equipment. The removal haul barges will be moved by tug boats to protect the containment system.

Dredging in the outer removal area will involve one barge and crane, and the outer containment barrier will have a door for the haul barge to move through. When haul barges are at 85% capacity, dredging will stop, and a door in the outer containment system will be opened briefly to allow for passage. Before opening the door, activities within the containment area will be halted until visual signs of suspended material in the water column subside. A bubble curtain will be activated across the door way to minimize fish movement into the containment area, and minimize the movement of suspended sediment outside the containment area.

Fuel barges that periodically moor at the Gasco dock will be immediately beside, but on the outside of, the containment system. They will also be carefully moved using tug boats.

Dredging. The applicant proposes to remove approximately 5,000 cy of tar material and approximately 10,000 cy of visually contaminated sediments. A closed-lip bucket will be used; however, the contractor may end up using a conventional clamshell bucket because the closed-lip bucket may not work for removing material that varies in consistency from hard to soft. Because approximately 75% of the surface tar is relatively stiff, initial removal work will likely use a large (*e.g.,* 8 cy) clamshell bucket, although other types may be used. The bucket will be mounted on a derrick to remove the tar. The material will be placed directly on sealed haul barge. The contractor will perform daily bathymetric surveys to monitor the progress of the dredging. Allowable overdredge is 6 inches.

Five clusters of wood pilings are within the dredge prism. The pilings will be pulled by the dredge bucket within the containment barriers. The contractor will endeavor to remove the pilings whole, but if a piling breaks at or below the mudline, the remainder of the piling may be removed during dredging. The pilings will be placed directly on the barge, separated from the sediment. Broken wood will be captured and removed.

Excess water in the transfer barge will be collected from four pumps placed at the corners of the barge and pumped to the area inside the containment curtain. If exceedances of water quality criteria are detected at the compliance points, EPA may elect to halt this practice if it is determined that it may be contributing to the exceedances. NW Natural will prepare a contingency plan to collect and treat this water.

Transport. When the sealed barge is filled to approximately 85% capacity, a drying reagent will be placed directly into the barge by a crane (this will be done outside of the containment area). The drying reagent could be quicklime, cement, or a paper byproduct. The off-loading crane will work the drying reagent into the dredge sediments, and then a clamshell bucket used to further mix the material. A bobcat or similar small piece of equipment will be used to move sediment in the barge and assist in mixing and unloading. The material will be tested after mixing using the Paint Filter Test to ensure the material is consistently and sufficiently dried throughout the barge. Excess water will not be released into the Willamette River or Columbia River after the drying reagent has been added.

The dried material will barged down the Willamette and then up the Columbia River navigation channel to the Port of Morrow transloading facility near Boardman, Oregon, for off-loading. No in-water activities or releases are anticipated at the Port of Morrow.

Once docked at the Port of Morrow, the material will be transferred from the barge to trucks using a clamshell bucket lifted by a crane on the dock and placed into lined trucks using a hopper to avoid spillage. Spillage will be prevented using best management practices (BMPs) including spill aprons over the water and spill control structures on land that prevent material from spilling directly into the water or running off the dock into the water. No water or material will be released to the river.

Disposal. Trucks will be loaded, inspected, covered, and then transported to the ChemWaste Subtitle C hazardous waste landfill in Arlington, Oregon. This landfill has a double liner, with both leak detection and leachate collection. BMPs will be used to prevent accidental tracking or spilling of contaminated material during overland transport to the landfill, and curbing and other BMPs will be used at the Port of Morrow facility to prevent surface runoff into the river.

Capping. After the dredging is complete, a cap will be placed over the removal area. This cap will cover any residual contamination, and is intended to be a temporary cover until the final cleanup for the site is implemented. The cap will be placed in the center of the removal area and along the slopes surrounding the capping area (fringe cap). Cap material will be imported, clean, granular material free of roots, organic material, contaminants, and all other deleterious material. The cap will be monitored to evaluate its effectiveness as a more long-term remedial action for a portion of the Gasco sediments. The cap is designed to withstand erosive forces that might reasonably be expected over the next five years.

The area of the cap will be approximately 18,600 square feet. It will be comprised of a 12-inch filter layer overlain with a 6-inch erosion layer. Grain size specifications for each layer are provided in the BA. The material for the erosion layer was selected to be protective for the 25-year flow event based on data for the lower Willamette River.

The fringe cap will be an additional 32,400 square feet, and will consist of a sand layer over the outer lateral edge of the dredged surface and side slopes. This layer will be 12 inches thick and will cover the channel ward extent of the dredge prism as well as an approximate 25-foot wide zone around the perimeter of the entire dredge prism, and an additional 25 feet (for a total of 50 feet) east of the dredge prism. This layer is expected to mix with the surface sediments.

The contractor will place the pilot capping erosion material in one 6-inch lift, filter material in two 6-inch lifts, and the fringing cover material in one 6-inch lift. The materials will be placed mechanically from a barge using a clamshell bucket within the containment systems. For each lift, the bucket will be cracked above the water surface while moving side to side to spread the material. Lead line measurements will be used to verify adequate coverage. Upon completion, the contractor will perform a bathymetric survey.

An upland source will be used for all capping materials.

Project Timing. The tentative schedule proposes commencing activities in July 2005 (Table 2). The project will take approximately two months to complete the dredging and cap placement. Most of the in-water activities will take place during September and October of 2005. NW Natural would like to work during the winter in-water work window if project activities take longer than expected.

Table 2. Construction sequencing and schedule.

Remedial Activity	Start	Finish
Silt Curtain Fabrication/Mob	July 1, 2005	August 25, 2005
Deploy Silt Curtain	August 26, 2005	September 2, 2005
Dredging/Disposal	September 5, 2005	October 14, 2005
Cap Placement	October 19, 2005	October 31, 2005

Monitoring and Conservation Measures. The following conservation measures have been incorporated into the project design to reduce adverse effects to ESA-listed salmonids and to minimize project effects to other resources. Conservation measures have been and will be considered during project design and sequencing. These measures will be included in contract specifications, as appropriate, and will be managed throughout project construction.
In addition to the BMPs described in the project description above, the following measures have been incorporated into the proposed action during dredging and capping operations:

1. The dredge area will be contained within a multiple barrier system during pile removal, dredging, and capping activities.
2. If Willamette River currents exceed one foot per second, operations will stop until currents are below this velocity.
3. The area within the containment system will be seined to remove as many fish as possible from within the containment barrier before dredging activities begin.

4. Unless otherwise authorized, the contractor will adhere to timing restriction specifying allowable in-water work periods. Dredging and capping are expected to be completed during the summer in-water work window (July 1 to October 31).
5. The proposed action will adhere to water quality protections and other conditions consistent with the substantive requirements of a 401 Water Quality Certification.
6. Turbidity and sheens will be settled/removed before the silt curtain doors are opened.
7. If a sizeable or substantial sheen is observed, existing protective measures will be re-evaluated for efficacy and the need for additional controls. Additional sorbent pads, booms, and other sorbent material will be on site at all times.
8. A spill response team and oil-skimming boat will be on call at all times during project activities to remove large sheens, if they occur.
9. Existing shoreline characteristics will be maintained to the maximum extent practicable (a staging issue).
10. Standard dredge operation controls will be practiced, including taking no multiple bites, no bottom or beach stockpiling of dredge material, minimal swing distance to the receiving barge, no over-water swinging to the haul barge outside the silt curtain, and pausing the dredge before opening or moving the silt curtain.
11. Additional dredge operation controls will be implemented if needed, including longer dredge cycle timing, limiting dredging during peak currents, and the use of specialty dredging equipment.
12. Global Positioning System (GPS) will be used to determine correct bucket location during dredging.
13. Barges will be sealed. Water releases will only be allowed within containment barriers and will be filtered before release.
14. Standard barge loading controls will be observed including no barge overfilling (nothing beyond 85% capacity).
15. Metal spill aprons, upland spill control curbing and collection systems, and other spill control measures will be used when transferring material from the haul barges to the transloading facility.
16. Equipment such as fuel hoses, oil drums, oil or fuel transfer valves and fittings will be checked regularly for drips or leaks, and shall be maintained to prevent spills to the river.
17. Cover/cap materials will be placed in a controlled and accurate manner, sprinkling the material rather than dropping it in larger amounts, and working from lower to higher elevations.
18. Sediment cap materials will be imported, clean, granular material free of roots, organic material, contaminants, and all other deleterious material.
19. Wood pilings will be pulled rather than dug, and all floating debris will be captured and disposed of at an appropriate facility.
20. If injured, sick, or dead ESA-listed species are observed in the project area, operations will be temporarily stopped to determine if additional fish are present, and to ensure that operations may continue without further impact. Measures will be taken to revise any activities that may have led to the problem, and to exclude fish from the immediate area.

The following measures have been incorporated into the proposed action during transportation and disposal operations:

1. No water will be created or discharged. Any free liquid remaining in the haul barge after drying reagents are added will be removed and contained for appropriate disposal.
2. Dock curbing will be used to prevent any potential spill material and rainwater from entering the river.
3. Water quality monitoring will be conducted around the barge at the removal and upland transfer facility to confirm that material has not been released. Soil sampling before and after project activities at the transfer facility and access road will be conducted to assess controls for off-site tracking.
4. Spill response and contingency plans will be prepared.
5. Once over land, the bucket will be emptied into a hopper to funnel material directly into lined trucks.
6. Trucks will be water tight and covered during transport to the disposal facility.
7. Trucks will be loaded on disposable pads/tarps and underloaded to minimize loss during transport.
8. Routine visual inspections of the truck loading area and access routes will be performed.
9. The transfer area and all equipment used in transfer activities will be cleaned and decontaminated.
10. Heavy equipment will be decontaminated according to the established facility procedures following contact with Gasco material before moving to an area where hazardous wastes are not actively managed.

The conservation measures described here as part of the proposed action, are intended to reduce adverse effects on ESA-listed species and their habitats. The NMFS regards those conservation measures as integral components of the proposed action and expects that all proposed project activities will be completed consistent with those measures. We have completed our effects analysis accordingly. Any project activity that deviates from these conservation measures will be beyond the scope of this consultation, will not be exempted from the prohibition against take as described in the attached incidental take statement, and will require further consultation to determine what effect the modified action may have on listed species or critical habitats.

Action Area

'Action area' means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action (50 CFR 402.02). For purposes of this consultation, the action area is within the Willamette River, approximately 6 miles upstream from its confluence with the Columbia River, along the west bank. The action area includes all aquatic habitat within the containment barriers, including the dredge and capping footprint, an area extending approximately 300 feet downriver of the dredge prism footprint, the barge loading and off-loading vicinities, and the Federally-authorized navigation channel between the dredging location in Portland Harbor on the Willamette River and the off-loading facility at the Port of Morrow (approximately RM 270) on the Columbia River.

The ESA-listed salmonids described in Table 1 use the project area for adult migration, and juvenile rearing and migration. The action area is designated critical habitat (Table 1). The action area is designated EFH for starry flounder (PFMC 1998a, 1999), Chinook salmon and coho salmon (PFMC 1999), and is in area where environmental effects of the proposed project may adversely affect EFH for those species.

ENDANGERED SPECIES ACT

The ESA establishes a national program to conserve threatened and endangered species of fish, wildlife, plants, and the habitat on which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with U.S. Fish and Wildlife Service, NMFS, or both, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. Section 7(b)(4) requires the provision of an incidental take statement that specifies the impact of any incidental taking and includes reasonable and prudent measures to minimize such impacts.

This Opinion presents NMFS' review of the status of each evolutionarily significant unit (ESU)[1] considered in this consultation, the condition of critical habitat, the environmental baseline for the action area, all the effects of the action as proposed, and cumulative effects (50 CFR 402.14(g)). For the jeopardy analysis, NMFS analyzes those combined factors to conclude whether the proposed action is likely to appreciably reduce the likelihood of both the survival and recovery of the affected ESA-listed species.

The critical habitat analysis determines whether the proposed action will destroy or adversely modify critical habitat for ESA-listed species by examining any change in the conservation value of the essential features of that critical habitat. This analysis relies on statutory provisions of the ESA, including those in Section 3 that define "critical habitat" and "conservation," in Section 4 that describe the designation process, and in Section 7 setting forth the substantive protections and procedural aspects of consultation. The regulatory definition of "destruction or adverse modification" at 50 CFR 402.02 is not used.

If the action under consultation is likely to jeopardize the continued existence of an ESA-listed species, or destroy or adversely modify critical habitat, NMFS must identify any reasonable and prudent alternative for the action that avoid jeopardy or destruction or adverse modification of critical habitat and meet other regulatory requirements (50 CFR 402.02).

Status of the Species and Critical Habitat

This section defines the biological requirements of each ESU, and reviews the status of each ESU and each affected critical habitat relative to those requirements. The present risk of extinction faced by each ESU informs NMFS' determination of whether additional risk will 'appreciably reduce' the likelihood that an ESU will survive or recover in the wild. The greater the present risk, the more likely it is that any additional risk resulting from the proposed action's effects on the population size, productivity (growth rate), distribution, or genetic diversity of the

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1 'ESU' means a population or group of populations that is considered distinct (and hence a 'species') for purposes of conservation under the ESA. To quality as an ESU, a population must (1) be reproductively isolated from other conspecific populations, and (2) represent an important component in the evolutionary legacy of the biological species (Waples 1991).

ESU (McElhany *et al*. 2000), or on the conservation value of critical habitat, will be an appreciable reduction.

Status of the Species. The NMFS reviews the condition of the species affected by the proposed action using criteria that describe a 'viable salmonid population' (VSP) (McElhany *et al*. 2000). Attributes associated with a viable salmonid population include the abundance, productivity, spatial structure, and genetic diversity that enhance its capacity to adapt to various environmental conditions and allow it to become self-sustaining in the natural environment. These attributes are influenced by survival, behavior, and experiences throughout the entire life cycle, characteristics that are influenced in turn by habitat and other environmental conditions.

LCR Chinook salmon. This ESU exhibits three major life history types: Fall-run, late fall-run, and spring-run, and spans three ecological zones: Coastal (rain-driven hydrograph), Western Cascade (snow- or glacial-driven hydrograph), and Gorge (transitioning to drier interior Columbia ecological zones). Historical records of Chinook salmon abundance are sparse, but cannery records suggest a peak run of 4.6 million fish in 1883. Although fall-run Chinook salmon are still present throughout much of their historical range, they are still subject to large-scale hatchery production, relatively high harvest, and extensive habitat degradation. The Lewis River late fall Chinook population is the healthiest in the ESU and has a reasonable probability of being self-sustaining. The spring-run populations are largely extirpated as the result of dams which block access to their higher elevation habitat. Abundances have largely declined since the last status review update (1998) and trend indicators for most populations are negative, especially if hatchery fish are assumed to have a reproductive success equivalent to that of natural-origin fish. However, 2001 abundance estimates increased for most LCR Chinook populations over the previous few years and preliminary indications are that 2002 abundance also increased (*as cited in* BRT 2003). In 2003, 2,873 fall-run Chinook salmon spawned in the main channel of the Columbia River between RM 113 and RM 143.

The predominant life history type for this ESU is the fall-run which consists of an early component that returns to the Columbia River in mid-August and spawns within a few weeks (Kostow 1995). A later returning component of the fall Chinook salmon run exists in the Lewis and Sandy Rivers. These fish enter the river over an extended period of time and spawn from late October through November. Spring-run Chinook salmon enter freshwater in March and April and spawn in late summer. Adults from this ESU pass through the action area from February through November, with peak passage occurring from mid-March through May, and from October through early November.

The majority of juveniles in this ESU leave as subyearlings, with downstream movement observed as early as December, with most moving during summer and fall months.

During electrofishing in shallow water habitat in the lower Columbia River near Portland during 1997 though 1999, juvenile Chinook salmon were the most abundant anadromous salmonids species present. Juveniles from this ESU may rear within the action area through the year.

UWR spring-run Chinook salmon. The UWR spring-run Chinook salmon ESU includes native spring-run populations above Willamette Falls and in the Clackamas River, although there are no direct estimates of the abundance of natural-origin spawners. In the past, it included sizable numbers of spawning salmon in the Santiam River, the middle fork of the Willamette River, and the McKenzie River, as well as smaller numbers in the Molalla River, Calapooia River, and Albiqua Creek. The total abundance of adult spring-run Chinook salmon (hatchery-origin + natural-origin fish) passing Willamette Falls has remained relatively steady over the past 50 years (ranging from approximately 20,000 to 70,000 fish), but it is an order of magnitude below the peak abundance levels observed in the 1920s (approximately 300,000 adults).

Until recent years, interpretation of abundance levels has been confounded by a high but uncertain fraction of hatchery-produced fish. The McKenzie River population has shown substantial increase in total abundance in 2001 and 2002, while trends in other natural populations in the ESU are generally mixed. It is expected that productivity will remain below replacement in the absence of artificial propagation programs. Of concern is that a majority of the spawning habitat and approximately 30 to 40% of total historical habitat are no longer accessible because of dams (BRT 2003).

Chinook salmon generally spawn and rear in mainstem reaches of large river systems such as the Willamette River and the Clackamas River. The Lower Columbia Slough is a low gradient, confluence area that would not have supported spawning, but would have supported prolonged rearing and would have provided refuge habitat. Juvenile Chinook salmon have been documented in the Lower Columbia Slough near the project area annually since 2001. Juvenile Chinook salmon (that have emerged from spawning sites in the upper Willamette River watershed) use the lower mainstem Willamette River and Columbia Slough through Portland for temporary rearing as they migrate to the ocean.

UCR spring-run Chinook salmon. The UCR ESU includes spring-run Chinook salmon populations found in Columbia River tributaries between Rock Island (RM 453 of Columbia River) and Chief Joseph Dams (RM 545 of Columbia River), notably the Wenatchee, Entiat, and Methow River basins. Historically, spring-run Chinook salmon may have also used portions of the Okanogan River. The populations in this ESU are genetically and ecologically separate from the summer and fall-run populations in the lower parts of many of the same river systems (Myers *et al*. 1998). They are considered genetically similar to spring-run Chinook in adjacent ESUs, however, they are distinguished by ecological differences in spawning and rearing habitat preferences.

Grand Coulee Dam (RM 596 of the Columbia River), completed in 1941, and Chief Joseph Dam are both impassable barriers for upstream migration of anadromous fish. No specific estimates are available of historical production of spring-run Chinook salmon from mainstem tributaries above Grand Coulee Dam. However, habitat typical of that used by spring-run Chinook salmon is found in the middle/upper reaches of mainstem tributaries above Grand Coulee Dam. Thus, it is possible that the historical range of this ESU included these areas. Alternatively, fish from the upper reaches of the Columbia River might have been considered a separate ESU.

All three of the existing UCR spring-run Chinook salmon populations have exhibited similar trends and patterns in abundance over the past 40 years. The 1998 Chinook salmon status review (Myers *et al.* 1998) reported that long-term trends in abundance for UCR spring-run Chinook salmon populations were generally negative, ranging from -5% to +1%. Analyses of the data series, updated to include 1996 to 2001 returns, indicated that those trends have continued with escapements in 1994 to 1996 being the lowest in the last 60 years. The Wenatchee River spawning escapements have declined an average of 5.6% per year, the Entiat River population an average of 4.8%, and the Methow River population an average rate of 6.3% since 1958 (BRT 2003). At least six former populations from this ESU are now extinct, and nearly all extant populations have fewer than 100 wild spawners. With these trends, extinction risks are high. The risk of extinction within 100 years for UCR spring-run Chinook salmon is 50% for the Methow, 98% for the Wenatchee, and 99% for the Entiat spawning populations (Cooney 2002).

The UCR spring-run Chinook ESU has a number of hurdles to overcome to become a VSP. The runs are subject to passage mortalities associated with mainstem hydroelectric projects. Production from all of these drainages passes through the four lower river Federal projects and a varying number of Mid-Columbia River Public Utility District projects. The Wenatchee River enters the Columbia River above seven mainstem dams, the Entiat above eight dams, and the Methow River and Okanogan Rivers above nine dams. In addition to the challenges put forth by dams, deleterious impacts to their habitat from increasing urbanization on the lower reaches, irrigation/flow diversions in up-river sections of the major drainage, and grazing impact on middle reaches all pose concerns for this ESU (BRT 2003).

Adult UCR spring Chinook salmon migrate upstream through the lower Columbia River in March through May, with the peak moving through the action area in mid-April. The yearlings likely move through the action area from late April through early July, with the majority present in late May.

SR spring/summer run Chinook salmon. It is estimated that at least 1.5 million spring/summer run Chinook salmon returned to the Snake River in the late 1800s; approximately 50 to 60% of all spring/summer run Chinook in the Columbia River basin. Historically, Shoshone Falls (RM 615) was the uppermost limit to spring/summer run Chinook migration, and spawning occurred in virtually all suitable and accessible habitat in the Snake River basin (Fulton 1968, Matthews & Waples 1991).

Actual counts of wild adults at Ice Harbor Dam (RM 9.7 of Snake River) annually averaged 59,000 each year from 1962 to 1970. The estimated number of wild adult spring and summer Chinook salmon passing over Lower Granite Dam (RM 107 of Snake River) was 9,674 fish per year between 1980 and 1990 (Matthews & Waples 1991). From 1992 to 1996, the average number of naturally-produced spawners was 3,820 fish per year (Myers *et al.* 1998). The 1997 to 2001 average return of natural-origin Chinook salmon exceeded 3,700 fish per year. In 2001, there was a large push of naturally-produced spring-run Chinook salmon to Lower Granite Dam that exceeded 17,000 fish, however, 88% of the return was still hatchery-origin fish. The summer Chinook run returning to the dam has increased as well from an average of 3,076 (1986-1996) to 6,000 fish per year (1997 to 2001) (BRT 2003).

SR spring/summer run Chinook salmon must migrate past a series of mainstem Snake and Columbia River hydroelectric dams on their migration to and from the ocean. The Tucannon River population must migrate through six dams; all other Snake River drainages supporting spring/summer run Chinook salmon production are above eight dams. Status reviews have concluded that mainstem Columbia and Snake River hydroelectric projects have resulted in a major disruption of migration corridors and affected flow regimes and estuarine habitat (BRT 2003).

Overall habitat conditions vary widely among the various drainages of the Snake River basin. There is habitat degradation in many areas of the basin reflecting the impacts of forest, grazing, and mining practices. Impacts relative to anadromous fish include lack of pools, increased water temperatures, low flows, poor overwintering conditions, and high sediment loads. However, there are substantial portions of the Salmon River drainage are protected by wilderness areas.

The peak run of adult SR spring Chinook through the action area occurs from early April to mid-May, and from late June to early July. This ESU tends to move downstream rapidly. Many juveniles in this ESU are transported by barge or truck around the Snake River and Columbia River dams and released downstream from Bonneville Dam. Juveniles travel through the action area from mid-June to late September.

SR fall-run Chinook salmon. No reliable estimates of historical abundance are available, but because of their dependence on mainstem habitat for spawning, fall-run Chinook have probably been affected to a greater extent by irrigation and hydroelectric projects than any other species of salmon in the Snake River basin. The mean number of adult SR fall-run Chinook salmon declined from 72,000 in the 1930s and 1940s, to 29,000 during the 1950s. In spite of this, the Snake River remained the most important natural production area for fall-run Chinook in the Columbia River basin through the 1950s. The number of adults counted at the uppermost Snake River mainstem dams averaged 12,720 total spawners per year from 1964 to 1968; 3,416 spawners from 1969 to 1974; and 610 spawners from 1975 to 1980 (Waples *et al.* 1991). In the late 1990s, the mean number of natural-origin adults returning per year over Lower Granite Dam (RM 107 of Snake River) was 871 fish. In 2001, over 2,600 natural-origin fall-run Chinook returned.

Historically, the primary fall-run Chinook salmon spawning areas were on the upper mainstem of the Snake River. However, approximately 80% of this historical habitat has been lost due to the construction of a suite of dams, so natural spawning is limited to the area from the upper end of Lower Granite Reservoir to Hells Canyon Dam (RM 247 of Snake River), the lower reaches of the Imnaha, Grande Ronde, Clearwater, and Tucannon Rivers, and small mainstem sections in the tailraces of the Lower Snake hydroelectric dams (BRT 2003). The loss of spawning habitat, restricting the extant ESU to a single naturally spawning population, increased the ESU's vulnerability to environmental variability and catastrophic events. The diversity associated with populations that once resided above the Snake River dams has been lost, and the impact of out-of-ESU fish straying to the spawning grounds has the potential to further compromise the genetic diversity of the ESU (NMFS 2004).

Adult SR fall-run Chinook are in the lower Columbia River in August through early October, with the peak moving through in early September. The juveniles emigrate through the project area from late June to late September.

CR chum salmon. Chum salmon in the Columbia River once numbered in the hundreds of thousands of adults and were reported in almost every river in the lower Columbia River basin, but by the 1950s most runs disappeared (Rich 1942, Marr 1943, Fulton 1970). The total number of chum salmon returning to the Columbia River in the last 50 years has averaged a few thousand per year, returning to a very restricted subset of the historical range. Significant spawning occurs in only two of the 16 historical populations, meaning that 88% of the historical populations are extirpated, or nearly so. The two remaining populations are in the Grays River and the Lower Gorge (BRT 2003).

Historically, the CR chum salmon ESU supported a large commercial fishery in the first half of this century, landing more than 500,000 fish per year as recently as 1942. Commercial catches declined beginning in the mid-1950s, and in later years rarely exceeded 2,000 per year.

During the 1980s and 1990s, the combined abundance of natural spawners for the Lower Gorge, Washougal, and Grays River populations was below 4,000 adults. In 2002, however, the abundance of natural spawners exhibited a substantial increase at several locations (preliminary estimate of natural spawners is approximately 20,000 adults). The cause of this dramatic increase in abundance is unknown. However, long- and short-term productivity trends for ESU populations are at or below replacement. The loss of off-channel habitat and the extirpation of approximately 17 historical populations increases this ESU's vulnerability to environmental variability and catastrophic events. Overall, the populations that remain are low in abundance and have limited distribution and poor connectivity (BRT 2003).

Chum salmon spawn in the main channel of the Columbia River between RM 113 and RM 114, near RM 123, between RM 136 and RM 139, and near Ives Island, RM 143. Chum salmon adult fish counts for 2003 are represented in Table 3.

Table 3. CR chum salmon (RM 113-143) escapement for 2003

Location	Live Fish	Carcasses
RM 113	275	12
RM 136	976	79
RM 137	66	12
RM 139	142	26
RM 143	1381	354

Adults from this ESU may occur in the vicinity of the action area from late September through December. Based on spawn timing, it is likely that emergence occurs from late January through April in the Columbia River tributaries. Therefore, they would be expected to pass the action area between early February and early May. Shoreline areas within the action area may provide short-term foraging and rearing habitat for juvenile chum.

LCR coho salmon. There is limited information on the 21 populations still thought to be in existence because most were considered extirpated, or nearly so, during the low marine survival period of the 1990s (NMFS 2001). There are only two extant populations in the ESU with appreciable levels of natural production: The Clackamas River and Sandy River. Although adult returns in 2000 and 2001 for the Clackamas and Sandy River populations exhibited moderate increases, the recent five-year average of natural-origin spawner for both populations represent less than 1,500 adults per year. The Sandy River population has exhibited recruitment failure in five of the last ten years and has exhibited a poor response to reductions in harvest. With these low numbers of natural-origin returning adults, the Clackamas, and especially Sandy River populations, are in a range where environmental, demographic, and genetic stochasticity can be significant risk factors (BRT 2003).

The extreme loss of naturally spawning populations, the low abundance of current populations, diminished diversity, and fragmentation and isolation of the remaining naturally-produced fish combine to create considerable risks for this ESU. The lack of naturally-produced spawners in this ESU is contrasted by the very large number of hatchery-produced adults. The abundance of hatchery coho returning to the lower Columbia River in 2001 and 2002 exceeded one million and 600,000, respectively. Approximately 40% of historical habitat is currently inaccessible, which restricts the number of areas that might support natural productivity, further increasing the ESU's vulnerability to environmental variability and catastrophic events (NOAA 2004). In 2003, 196 adult coho salmon spawned in the main channel of the Columbia River between RM 113 and RM 143.

Adults would usually migrate past Terminal 6 from September to march, with the majority passing during October and November. Juveniles are likes to pass Terminal 6 on their downstream migration from April through June.

SR sockeye salmon. SR sockeye salmon are a distinct and unique group. They spawn at a higher elevation (6,500 feet), and have a longer freshwater migration (932 miles) than any other sockeye salmon population in the world. Before the turn of the century (c. 1880), about 150,000 sockeye salmon ascended the Wallowa, Payette, and Salmon River basins to spawn in natural lakes (Evermann 1896). Sockeye populations in the Payette basin lakes were eliminated after a diversion dam near Horseshoe Bend was constructed in 1914, and Black Canyon Dam was completed in 1924. In 1916, a dam at Wallowa Lake was increased in height, resulting in the extinction of indigenous sockeye in Wallowa Lake. Sockeye salmon in the Salmon River occurred historically in at least four lakes within Idaho's Stanley basin: Alturas, Redfish, Pettit, and Stanley Lakes. Sunbeam Dam, 20 miles downstream from Redfish Lake, severely limited sockeye and other anadromous salmonid production in the upper Salmon River between 1910 to 1934 (Waples *et al.* 1991). In the 1950s and 1960s, more than 4,000 adults returned annually to

Redfish Lake. Between 1985 and 1987, an average of 13 sockeye were counted at the Redfish Lake weir. Between 1988 and 1998, only 18 sockeye returned to Redfish Lake. Starting in 1999, all adults returning to the weir were progeny of the captive broodstock program: seven returned in 1999, 257 in 2000, 26 in 2001, and 22 in 2002 (BRT 2003).

Adults from this ESU would be expected to pass through the action area starting in late May and continuing through early August, with the peak migrating during June and early July. Wild sockeye smolts would be expected in the action area from late April to early July, with the peak in late May.

LCR steelhead. The LCR ESU includes all naturally spawning populations of steelhead in streams and tributaries of the Columbia River between, and including, the Cowlitz and Wind Rivers in Washington, along with, and including, the Willamette and Hood Rivers in Oregon. Excluded are steelhead in the upper Willamette River basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington (NOAA 2004).

All runs in the LCR steelhead ESU have declined from 1980 to 2000, with sharp declines beginning in 1995. Historic counts in some of the larger tributaries (Cowlitz, Kalama, and Sandy Rivers) probably exceeded 20,000 fish while in the 1990s fish abundance dropped to 1,000 to 2,000 (NMFS 2000). Even more recently, 1997-2002, the average has not been greater than 750 spawners per population.

A number of populations have a substantial fraction of hatchery-origin spawners and are hypothesized to be sustained largely by hatchery productions. Exceptions are the Kalama, the North Fork Toutle, the South Fork Toutle, and East Fork Lewis winter-run populations, which have few hatchery fish spawning on the natural spawning areas. These populations have relatively low recent mean abundance estimates, with the largest being the Kalama (mean 726 spawners) (BRT 2003). Long-term trends in spawner abundance are negative for seven of the nine populations for which there are sufficient data, and short-term trends are negative for five of seven populations. It is estimated that four historical populations have been extirpated or nearly extirpated, and only one-half of 23 historical populations currently exhibit appreciable natural productivity.

Concerns for the viability of this ESU include habitat loss, hatchery steelhead introgression, and harvest pressures. Approximately 35% of historical habitat has been lost due to the construction of dams or other impassable barriers. Also of concern is the impact to diversity from the high proportion of hatchery-origin spawners in the ESU, the disproportionate declines in the summer steelhead life history, and the release of nonnative hatchery summer steelhead in the Cowlitz, Toutle, Sandy, Lewis, Elochoman, Kalama, Wind, and Clackamas Rivers (NOAA 2004).

Fish sampling conducted for the Port of Portland in the Columbia River during spring 1998 found that downstream migrant steelhead smolt abundance peaked in early May and declined through late June. Based on these efforts and other earlier sampling, it is likely that fewer juvenile steelhead travel along the shoreline at Terminal 6 than in deeper, open water habitat.

UWR steelhead. The UWR steelhead ESU includes all naturally spawning populations of winter-run steelhead in the Willamette River and its tributaries upstream from Willamette River Falls to, and including, the Calapooia River (NOAA 2004). Over the past several decades, total abundance of natural, late-migrating winter steelhead ascending the Willamette Falls fish ladder has fluctuated several times over a range of approximately 5,000 to 20,000 spawners. However, the last peak occurred in 1988, and this peak has been followed by a steep and continuing decline. Abundance in each of the years from 1993 to 1998, was below 4,300 fish, and the run in 1995 was the lowest in 30 years. In 2001 and 2002, the adult returns have significantly increased (exceeding 10,000 total fish) for the ESU. However, the recent five-year average abundance remains low for the entire ESU (5,819 adults), and individual populations remain at low abundance. Long-term trends in abundance are negative for all populations in the ESU, reflecting a decade of consistently low returns during the 1990s. Approximately one-third of the ESU's historically accessible spawning habitat is now blocked. Notwithstanding the lost spawning habitat, the ESU continues to be spatially well-distributed, occupying each of the four major subbasins: The Molalla, North Santiam, South Santiam, and Calapooia Rivers. The cessation of the 'early' winter-run hatchery program is considered a positive sign for ESU diversity risk but there are still concerns that releases of non-native summer steelhead continue (NOAA 2004).

Habitat loss, hatchery steelhead introgression, and harvest are the major contributors to the decline of steelhead in this ESU. Willamette Falls (RM 26.5) is a known migration barrier. Winter-run steelhead and spring-run Chinook salmon historically occurred above the falls, whereas summer-run steelhead, fall-run Chinook, and coho salmon did not. Detroit and Big Cliff Dams cut off access to 335 miles of spawning and rearing habitat in the North Santiam River. In general, habitat in this ESU has become substantially simplified since the 1800s by removal of large woody debris to increase the river's navigability.

MCR steelhead. The MCR steelhead ESU includes all naturally spawning populations of steelhead in Oregon and Washington drainages upstream from the Hood and Wind River systems to, and including, the Yakima River. The Snake River is not included in this ESU. Major drainages in this ESU are the Deschutes, John Day, Umatilla, Walla-Walla, Yakima, and Klickitat River systems. The John Day River probably represents the largest native, naturally spawning stock of steelhead in the region. Summer steelhead are widespread throughout the ESU; winter steelhead occur in Mosier, Chenowith, Mill, and Fifteenmile Creeks in Oregon, and in the Klickitat and White Salmon Rivers in Washington.

Estimates of historical (pre-1960s) abundance specific to this ESU are available for the Yakima River, which has an estimated run size of 100,000 (WDF *et al.* 1993 *as cited in* NOAA 2000). Assuming comparable run sizes for other drainage areas in this ESU, the total historical run size may have exceeded 300,000 steelhead (NOAA 2000). Current population sizes are substantially lower than historic levels, especially in the rivers with the largest steelhead runs in the ESU, the John Day, Deschutes, and Yakima Rivers. At least two extinctions of native steelhead runs in the ESU have occurred: the Crooked and Metolius Rivers, both in the Deschutes River basin). In 2002, the count of Bonneville Dam steelhead totaled 481,203, and exceeded all counts recorded at Bonneville Dam since 1938, except the 2001 total, which was 633,464. 2003 had a decline of total steelhead counts to 361,412. For each of these years, the percentage of the return that has been considered wild steelhead has remained fairly constant. In 2001, 24% of the return was wild, in 2002 30% of the return was wild and in 2003 that percentage increased slightly to 31% (FPC 2004).

Hatchery facilities are in a number of drainages within this ESU, although there are also subbasins with little or no direct hatchery influence. The John Day River system, for example, has not been outplanted with hatchery steelhead. Similarly, hatchery production of steelhead in the Yakima River system was relatively limited historically and has been phased out since the early 1990s. However, the Umatilla and the Deschutes River systems each have ongoing hatchery production programs based on locally-derived broodstocks. Moreover, straying from out-of-basin production programs into the Deschutes River has been identified as a chronic occurrence (BRT 2003).

Blockages have prevented access to sizable steelhead production areas in the Deschutes River and the White Salmon River. In the Deschutes River, Pelton Dam blocks access to upstream habitat historically used by steelhead. Conduit Dam, constructed in 1913, blocked access to all but 2 to 3 miles of habitat suitable for steelhead production in the Big White Salmon River (Rawding 2001 *as cited in* BRT 2003).

Overall, this ESU is one which shows a wide variation in its ability to remain viable. First, the status of different populations within the ESU varies greatly. On the one hand the abundance in two major basins, the Deschutes and John Day, is relatively high and over the last five years is close to or slightly over the interim recovery targets (NOAA 2000). On the other hand, steelhead in the Yakima basin, once a large producer of steelhead, remain severely depressed (10% of the interim recovery target), in spite of increases in the last two years. Furthermore, in recent years escapement-to-spawning grounds in the Deschutes River have been dominated by stray, out-of-basin (and largely out-of-ESU) fish, which raises substantial questions about genetic integrity and productivity of the Deschutes population. The John Day is the only basin of substantial size in which production is clearly driven by natural spawners. Another difficult issue centers on how to evaluate the contribution of resident fish, which are very common in this ESU and may greatly outnumber anadromous fish (Kostow 2003 *as cited in* BRT 2003).

Some adult fish from this ESU could occur in the action area from April through January while downstream migration occurs from late March through June, with peak abundance occurring from late April through mid-May.

UCR steelhead. This inland steelhead ESU occupies the Columbia River basin upstream from the Yakima River to the U.S./Canada border. Rivers in the area primarily drain the east slope of the northern Cascade Mountains and include the Wenatchee, Entiat, Methow, and Okanogan River basins. Estimates of historical (pre-1960s) abundance specific to this ESU are available from fish counts at dams. Counts at Rock Island Dam (RM 453 of Columbia River) from 1933 to 1959, averaged 2,600 to 3,700 fish, suggesting a pre-fishery run size exceeding 5,000 adults for tributaries above Rock Island Dam (Chapman *et al.* 1994, Busby *et al.* 1996). lower Columbia River harvests had already depressed fish stocks during the period in which these counts were taken, thus, the pre-fishery estimate should be viewed with caution. The average (natural-origin + hatchery-origin fish) returning through Priest Rapids Dam (RM 397 of Columbia River) for 1992 through 1996 was 7,800 fish. For 1997 through 2001, the average annual return was 12,900. In 2002, 15,286 steelhead were counted at Rock Island Dam (RM 453 of Columbia River, which is above Priest Rapids Dam, but below the Wenatchee, Entiat, Methow, and Okanogan Rivers), compared with the 2001 count of 28,602, and the 10-year average return of 9,165. Of the total steelhead counted at Rock Island Dam in 2002, 10,353 were wild steelhead (FPC 2003).

Total returns to the upper Columbia River continue to be predominately hatchery-origin fish. Hatchery production averaged approximately 300,000 smolts/year in the 1960s, 425,000 in the 1970s, 790,000 in the 1980s, and more than 800,000 in the 1990s (including releases exceeding 1 million). The Wenatchee, Methow, and Okanogan are planted with hatchery smolts each year while the Entiat basin has been designated as natural production 'reference' drainage basin, *i.e.,* no hatchery outplantings (BRT 2003).

The natural-origin percentage of the run over Priest Rapids Dam, which is below the UCR steelhead ESU production areas, increased to over 25% in the 1980s, then dropped to less than 10% by the mid-1990s. From 1992 to 1996 the average natural component of the annual steelhead run over the dam was 1,040 and did increase for the later part of the decade to 2,200 (1997-2001) which corresponded to a median percentage of 17% for natural-origin fish per year (BRT 2003). For the Wenatchee and Entiat Rivers, the combined natural steelhead return was approximately 900 fish per year from 1996 to 2001. The average percentage of natural-origin fish dropped from 35%, pre-1996, to 29% for 1996 to 2001. The Methow River steelhead population is the primary natural production area above Wells Dam (RM 515 of Columbia River). The average return of fish per year from 1997 to 2001 over Wells Dam was 358, lower than the average reported before the 1998 status review. In 2001, 1,380 naturally-produced steelhead returned to Wells Dam which was the highest single annual return in the 25-year data series. Hatchery returns continue to dominate the run over Wells Dam. The average percent of wild origin dropped to 9% for 1996-2001, compared to 19% for the period before 1998 (BRT 2003).

Overall, habitat degradation and juvenile and adult mortality in the hydropower system have contributed to the declines and represent risk factors for the future. The construction of Grand Coulee Dam in 1939 blocked access to over 50% of the river miles formerly available to UCR steelhead (NRC 1996). Harvest in lower river fisheries, thus death from by-catch, and genetic homogenization from composite broodstock collection are other factors that may contribute significant risk to the UCR steelhead ESU.

UCR steelhead typically spend from one to two years in the ocean before returning to spawn. Adults move through the action area from late June through early November, with the peak occurring in late August to mid-September. Smolts do not substantial time rearing in the lower Columbia River, and probably pass through the action area from mid-May through mid-June.

SRB steelhead. Although direct historical estimates of production from the Snake basin are not available, the basin is believed to have supported more than half of the total steelhead production from the Columbia basin (NOAA 2000). Some historical estimates of returns are available for portions of the drainage. Counts of steelhead passing through the adult fish ladder at the Lewiston dam on the lower Clearwater, which began operation in 1927, averaged approximately 40,000 per year between 1949 and 1971. Extrapolations from tag/recapture data indicate that the natural steelhead return to the Tucannon River (a small tributary to the Snake River below Lewiston, Idaho) may have exceeded 3,000 adults in the mid-1950s (WDF 1991 *as cited in* BRT 2003). In the early 1960s, returns to the Grande Ronde and Imnaha Rivers may have exceeded 15,000 and 4,000 steelhead per year, respectively (ODFW 1991 *as cited in* BRT 2003). By the mid-1980s natural stocks were beginning to show a sharp decline in returns. In the 1990s, the average escapement for 1990 to 1994 above Lower Granite Dam was approximately 71,000. However, the wild component of this run was only 9,400 adults (7,000 A-run and 2,400 B-run) (Busby *et al.* 1996). The 2001 return (262,568 total steelhead) over Lower Granite Dam was substantially higher than the low levels seen in the 1990s, and the recent five-year mean abundance (14,768 natural returns) is approximately 28% of the interim recovery target level (NOAA 2004).

Recent review of this ESU highlighted continued concern for its viability. Historically, SRB steelhead spawned in virtually all accessible habitat in the Snake River up to Shoshone Falls (RM 615). The availability of this habitat has been significantly reduced due to the development of irrigation and hydropower projects on the mainstem Snake River. The ESU remains spatially well distributed in each of the six major geographic areas in the Snake River basin. However, the SRB steelhead 'B-run' was particularly depressed. High straying rates, thus, replacement of naturally-produced fish by hatchery fish, are of concern because of the possible homogenization of population structure and diversity (NOAA 2004).

Adults migrate through the action area from June to October, with the peak occurring in late June and early July. The downstream migration of juveniles occurs from April through June.

Status of Critical Habitat. The NMFS reviews the status of critical habitat affected by the proposed action by examining the condition and trends of primary constituent elements (PCEs) throughout the designated area. PCEs consist of the physical and biological elements identified as essential to the conservation of the species in the documents identifying critical habitat (Table 4).

Table 4. Types of sites and essential physical and biological features designated as PCEs, and the species life stage each PCE supports

Site	Essential Physical and Biological Features	ESU Life Stage
Freshwater spawning	Water quality, water quantity, and substrate	Spawning, incubation, and larval development
Freshwater rearing	Water quantity and floodplain connectivity	Juvenile growth and mobility
	Water quality and forage	Juvenile development
	Natural cover[a]	Juvenile mobility and survival
Freshwater migration	Free of artificial obstructions, water quality and quantity, and natural cover[b]	Juvenile and adult mobility and survival
Estuarine areas	Free of obstruction, water quality and quantity, and salinity	Juvenile and adult physiological transitions between salt and freshwater
	Natural cover,[a] forage,[b] and water quantity	Growth and maturation
Nearshore marine areas	Free of obstruction, water quality and quantity, natural cover,[a] and forage[b]	Growth and maturation, survival
Offshore marine areas	Water quality and forage[b]	Growth and maturation

[a] Natural cover includes shade, large wood, log jams, beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

[b] Forage includes aquatic invertebrate and fish species that support growth and maturation.

The project reach is within designated critical habitat for the affected ESUs, except LCR coho salmon, for which critical habitat has not been proposed or designated. The PCEs potentially found at the project site are freshwater rearing and freshwater migration. Moreover, spawning habitat for CR chum salmon and LCR Chinook salmon is present beside the Columbia River navigation channel. The value of critical habitat for both ESUs is limited by poor water quality, altered hydrology, and lack of floodplain connectivity and shallow water habitat, and lack of complex habitat to provide forage and cover.

Environmental Baseline

The 'environmental baseline' includes the past and present impacts of all Federal, state, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal projects in the action area that have already undergone formal or early Section 7 consultation, and the impact of state or private actions which are contemporaneous with the consultation in process (50 CFR 402.02). For projects that are ongoing actions, the effects of future actions over which the Federal agency has discretionary involvement or control will be analyzed as 'effects of the action.'

The NMFS describes the environmental baseline in terms of the biological requirements for habitat features and processes necessary to support all life stages of the subject ESUs within the action area. When the environmental baseline departs from those biological requirements, the adverse effects of a proposed action on the ESU or its habitat are more likely to jeopardize the listed species or result in destruction or adverse modification of a critical habitat (NMFS 1999).

Each ESU considered in this Opinion resides in or migrates through the action area. Thus, for this action area, the biological requirements for salmon and steelhead are the habitat characteristics that support successful juvenile rearing, juvenile and adult migration, and spawning.

The action area is within the lower Willamette River watershed starting at RM 6. The Willamette River watershed covers approximately 11,500 square miles in northwest Oregon between the Coast and Cascade mountain ranges. The river travels 187 miles from its headwaters to its mouth at the Columbia River. Most of the rainfall occurs in the fall, winter, and spring, with little rainfall during June, July, and August. The lowest river flow occurs during late summer. The 13 U.S. Army Corps of Engineers dams on tributary systems largely regulate flows in the mainstem Willamette River.

Significant changes have occurred in the watershed since the arrival of Europeans in the 1800s. The watershed was mostly forested land before the arrival of white settlers. Now, about half the basin is still forested. One-third of the basin is used for agriculture, and about 5% is urbanized or is in residential use. The river receives direct inputs from treated municipal wastes and industrial effluents. Nonpoint source input from agricultural, silvicultural, residential, urban and industrial land uses are also significant, especially during rainfall runoff.

The Willamette River, from its mouth to Willamette Falls, is currently on the 1998 Oregon DEQ 303(d) list as water quality limited for the following parameters: Temperature (summer), bacteria, biological criteria (fish skeletal deformities), and toxics (mercury in fish tissue). Results from DEQ ambient monitoring data indicate that 68% of the values at RM 7, and 61% of the values at RM 13.2 collected during the summer exceed the temperature standard of 68°C. Sediment conditions in the Willamette River watershed range from excellent in some of the upper tributaries to poor in much of the mainstem of the river (Altman *et al.* 1997). In the lower Willamette River, average turbidity levels tend to be higher in fall and winter. Monthly average turbidity ranges from 4-149 nephelometric turbidity units (NTUs).

In 1997, DEQ and the EPA took sediment samples within the Portland Harbor. The results of the study indicated that sediments in the harbor, including within the project area, contain concentrations of metals, PCBs, pesticides, herbicides, dioxins/furans, tributyltin (TBT), and PAHs above EPA contaminant guidelines. Cleanup of the contaminated sediments is presently being addressed under the Federal Superfund process. In addition, the skeletal deformities in fish upstream from Willamette Falls suggest that there may also be chemical contamination upstream from the Portland Harbor area.

As part of the remedial investigation for the Portland Harbor Superfund, a group of potentially liable parties (the Lower Willamette Group) along with DEQ and EPA, have been investigating the physical, chemical, and biological characteristics of the Portland Harbor. In addition, NW Natural has conducted additional testing at the Gasco Site. The primary hazardous substances and pollutants associated with the tar body are PAHs, benzene, naphthalene, toluene, ethybenzene, and xylenes (BTEX), and cyanide. Other metals, semi-volatile organic compounds (SVOCs), and volatile organic compounds (VOCs), have also been detected at elevated levels. Chemical concentrations detected within the tar body include total PAHs up to 26,400 mg/Kg, benzene up to 22 mg/Kg, and naphthalene up to 5,100 mg/Kg. Samples collected immediately beside the tar body also had elevated concentrations of contaminants, with total PAHs up to 11,271 mg/Kg, benzene up to 70 mg/Kg, and naphthalene up to 4,400 mg/Kg in a samples collected from 5 to 8.5 feet below the mud line. The results of these tests has lead to the determination that the contamination at the Gasco Site may create an imminent and substantial endangerment to the environment in part through the actual or potential exposure of the river water, river sediments, surface soils and standing water to hazardous substances and contaminants. Further, tar and associated contaminants from historical releases continues to erode and be deposited on nearby beaches posing an actual or potential threat of exposure, resulting in threats to environmental and human health. Willamette River stage and current fluctuation can accelerate erosion of the high PAH material in the river.

Sediment toxicity testing (bioassay tests) was conducted with Gasco surface sediment samples during the RI. Thirteen sediment samples were collected from the Gasco in-water area, some of which were beside or in proximity to the tar body. Bioassay tests used *Chironomus tentuns* (midge) and *Hyalella azteca* as the test species. Many of the samples had near 100% mortality, indicating the highly degraded nature of the action area.

Habitat conditions within the lower Willamette River are also highly degraded. The streambanks have been channelized, off-channel areas removed, tributaries put into pipes, and the river disconnected from its floodplain as the lower valley was urbanized. Silt loading to the lower Willamette River has increased over historic levels due to logging, agriculture, road building, and urban and suburban development within the watershed. The river in the vicinity of the Gasco Site has a soft bottom, with little or no aquatic vegetation. Limited opportunity exists for large wood recruitment to the lower Willamette River due to the paucity of mature trees along the shoreline, and the lack of relief along the shoreline to catch and hold the material. The banks of the river in the action area are heavily industrialized, with much of the bank hardened with riprap, vertical concrete walls, and docking facilities. Much of the historic off-channel habitat has been lost due to diking and filling of connected channels and wetlands. Columbia Slough, downstream from the project site, is the closest remaining off-channel habitat. Connections between the slough and the river have been cut off, and dikes have been constructed along much of the slough.

The shoreline at the Gasco Site is lightly vegetated with non-native plants or riprapped, with some areas of exposed soil. The shoreline in the vicinity of the tar body is relatively flat with some herbaceous vegetation at the toe of a steep bank.

The site is in dynamic equilibrium, meaning there is no net loss or deposition of sediment. Beside the site, sediments are deposited and scoured in sequence depending on river conditions, with no net gain or loss. There are no ongoing discharges of tars or oils from the upland portions of the site to the river, and seeps of oils or related product-type materials have not been observed along the shoreline of the site.

The Willamette River is tidally influenced at the project site. In addition to Chinook salmon and steelhead, coho salmon, chum salmon, American shad, and white sturgeon occur in the area. Cutthroat trout are also present, but their abundance is low. Both juveniles and adults use the project area as a migratory corridor and as rearing habitat for juveniles. Because of the highly degraded nature of the site, it is unlikely that juvenile salmonids are feeding in the action area.

The City of Portland and the Oregon Department of Fish and Wildlife (ODFW) have recently completed a four-year study to evaluate relationships between fish communities and waterway developments (ODFW 2005). Their data demonstrate that juvenile salmonids are present in the lower Willamette River during every month sampled. The abundance of all juvenile salmonids increased beginning in November, peaked in April, and declined to near zero by July. Some of the larger juveniles may spend extended periods of time in off-channel habitat. Mean migration rates of juvenile salmonids ranged from 2.7 km/day for steelhead to 8.6 km/day for subyearling Chinook salmon. Residence time in the lower Willamette River ranged from 4.9 days for Chinook to 15.8 days for steelhead. Catch rates of juvenile salmonids were significantly higher at sites composed of natural habitat (*e.g.*, beach, rock) and alcoves. Juvenile salmonids tended to move along the east bank of the river. The densities of fish found throughout the year in the lower Willamette River were a surprise given the degree of habitat and water quality degradation.

In addition to the project site at RM 6 on the Willamette River, the action area includes the transport corridor down the Willamette River to the Columbia River, and upstream on the Columbia River to the barge off-loading site at the Port of Morrow.

The Columbia River is approximately 1,210 miles long, and drains a watershed area of approximately 260,000 square miles. This portion of the river has been affected by the development and operation of the Federal Columbia River Power System (FCRPS) (NMFS 2004). Storage dams have eliminated spawning and rearing habitat and have altered the natural hydrograph of the Snake and Columbia Rivers, decreasing spring and summer flows and increasing fall and winter flows. Power operations cause flow levels and river elevations to fluctuate, affecting fish movement through reservoirs and riparian ecology, and stranding fish in shallow areas. The eight dams in the migration corridor of the Snake and Columbia Rivers alter smolt and adult migrations. Smolts experience a high level of mortality passing through the dams. The dams also have converted the once-swift river into a series of slow-moving reservoirs, slowing the smolts' journey to the ocean and creating habitat for predators. Water velocities throughout the migration corridor now depend far more on volume runoff than before development of the mainstem reservoirs.

There have been numerous changes in the operation and configuration of the FCRPS as a result of ESA consultations between the Bonneville Power Administration, U.S. Army Corps of Engineers, Bureau of Reclamation, NMFS, and U.S. Fish and Wildlife Service. The changes have improved survival for the ESA-listed salmonids migrating through the Snake and Columbia

Rivers. Increased spill at all FCRPS dams allows smolts to avoid both turbine intakes and bypass systems. Increased flow in the mainstem Snake and Columbia Rivers provides better in-river conditions for smolts. The transportation of smolts from the Snake River has also been improved by the addition of new barges and modification of existing barges. In addition to spill, flow, and transportation improvements, the COE implemented numerous other improvements to project operations and maintenance at all Columbia and Snake River dams. These improvements, such as operating turbines at peak efficiency, new extended-length screens at McNary, Little Goose, and Lower Granite Dams, and extended operation of bypass screens, are discussed in greater detail in the 2004 FCRPS Biological Opinion (NMFS 2004).

Historically, floodwaters of the Columbia River inundated the margins and floodplains along the estuary, allowing juvenile salmon access to a wide expanse of low-velocity marshland and tidal channel habitats (Bottom *et al*. 2001). In general, the riverbanks were gently sloping, with riparian and wetland vegetation at the higher elevations of the river floodplain becoming salmonid habitat during flooding river discharges or flood tides. One example of land use alteration is the diking and filling of floodplains formerly connected to the tidal river, which has resulted in the loss of large expanses of low-energy, off-channel habitat for salmonids rearing and migrating during high flows. These activities have contributed to narrowing and confining the river to its present location. Between the Willamette River and the mouth of the Columbia River, diking, flow regulation, and other human activities have resulted in a confinement of 84,000 acres of floodplain that likely contained large amounts of tidal marsh and swamp. The lower Columbia River's remaining tidal marsh and swamp habitats are in a narrow band along the Columbia River and its tributaries' banks, and around undeveloped islands.

Finally, designated critical habitat within the action area includes the PCE of being a migratory corridor. All ESA-listed salmonids (ocean-type and stream-type) must pass in the vicinity of the action area twice, once as juveniles en route to the Pacific Ocean and again as adults when they return to spawn.

In summary, NMFS concludes that not all of the biological requirements of the ESA-listed salmonids within the action area in the lower Willamette River and Columbia River are being met under current conditions. Based on the best available information on the subject species status, including population status, trends, and genetics, and the environmental baseline conditions within the action area, significant improvement in habitat condition (including water and sediment quality) is needed to meet the biological requirements for the survival and recovery of the species.

Effects of the Action

'Effects of the action' means the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action, that will be added to the environmental baseline (50 CFR 402.02). If the proposed action includes offsite measures to reduce net adverse effects by improving habitat conditions and survival, NMFS will evaluate the net combined effects of the proposed action and the offsite measures as interrelated actions.

'Interrelated actions' are those that are part of a larger action and depend on the larger action for their justification; 'interdependent actions' are those that have no independent utility apart from the action under consideration (50 CFR 402.02). Future Federal actions that are not a direct effect of the action under consideration, and not included in the environmental baseline or treated as indirect effects, are not considered in this Opinion.

'Indirect effects' are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). Indirect effects may occur outside the area directly affected by the action, and may include other Federal actions that have not undergone Section 7 consultation but will result from the action under consideration.

The proposed action will affect the ESA-listed salmonids by causing physical, chemical, and biological changes to the environmental baseline, and through direct effects to listed salmonids. These include both negative water quality effects (turbidity and increased exposure to contaminants) as well as beneficial effects to water quality (removal of an in-water source of contamination), and effects to the prey base for fish, effects to fish caused by handling during work area isolation, and possible effects associated with entrainment in the dredge bucket.

Effects to Water Quality. The proposed action will reduce water quality during and immediately following dredging. Concentrations of contaminants in the water column and turbidity will increase. Contaminants associated with the dredge plumes of resuspended material, or the loss of sediment porewater, may dissolve in the water column and negatively affect water quality by increasing the concentration of contaminants. As well, more mobile contaminants may be exposed after dredging and before placement of the cap, thus increasing the potential for higher concentrations of contaminants in the water column. There is a high potential for release of contaminated sediments outside of the containment when the drying reagent is mixed with the dredged sediment in the barge. There is also a small risk of an accidental spill from construction equipment during the project, and during off-loading at the Port of Morrow.

A screening analysis conducted by NW Natural indicated that the PAHs anthracene, benzo(a)anthracene, benzo(a)pyrene, fluorine, naphthalene, and phenanthrene may exceed acute water quality guidelines during dredging activities. Other chemicals that may exceed the guidelines include copper, cyanide, ethylbenzene, and toluene. NW Natural used an analytical model to further refine their predictions of contaminant concentrations during dredging. The model assumed that no silt curtains were used and only looked at resuspension as the source of contamination. The model results showed that all chemicals would be at or below their acute guidelines at 200 feet from the dredging operation with the exception of benzo(a)pyrene. NW Natural estimates that the silt curtain would reduce the risk of exceedance by 50%, and the silt curtain will be approximately 50 feet from the dredging operation. Therefore, there is a real risk of exceedance of acute criteria between 50 feet and 200 feet for benzo(a)pyrene, and potentially for the other chemicals as well.

Additional analyses indicate that benzo(a)anthracene, benzo(a)pyrene, and fluoranthene (all PAHs) have a greater than 50% chance of exceeding chronic water quality guidelines at 400 feet from the dredge, and that naphthalene has a 5% change of exceeding chronic guidelines at 200 feet from the dredge.

Water from the transfer barges will be pumped into the containment area. Discharging contaminated water into the water column is likely to increase the release of dissolved contamination that cannot be contained by the permeable silt curtain. The applicant is relying on the silt curtain to keep these contained. However, the utility of the silt curtain to contain dissolved contaminants is limited, and therefore this activity will increase the risk of toxic concentrations of contaminants downstream of the dredge activities.

Removal of the silt curtain after the dredging is completed will likely increase the release of contaminated sediments. The silt curtain is designed to trap material, and some portion of this material will be released during removal of the curtain. The suspended material should settle out of the water column and onto downstream sediments within a few hours.

The risk of contaminant exceedances would be greater during the winter in-water work window than the summer in-water work window because the risk of failure of the silt curtain is greater in the winter when flows are greater. The ability of NW Natural to maintain the integrity of the silt curtain decreases when flows exceed 1 fps. This is likely to occur in November and through the winter. The silt curtain decreases the risk of toxic exceedances by half; therefore, the risk of exposure would increase substantially with a breach in the silt curtain.

This information is based on resuspension of contaminated sediments, and does not consider the release of contaminants from the newly-exposed surface. Contaminants are present in the sediments far deeper than the proposed dredge prism, and will likely be a source until the cap is placed. Dredging is scheduled to begin on September 5, 2005, and the cap will not be completed until October 31, 2005. The tar body is a crusty layer over the area, and once removed, it is likely that the more mobile contaminants will be released. This will increase the risk of water quality exceedances downstream (and upstream when the tide is coming in) of dredging activities.

Another source of risk of toxic exposure is while the drying reagent is being mixed with contaminated sediment on the barge. Heavy equipment and the crane bucket will be used to accomplish the mixing, and it will occur just outside of the containment area in the Willamette River. If spilled, the drying reagent could alter the pH of the surrounding water and be an additional source of toxic exposure.

There is also a potential for increased turbidity and exposure to contaminated sediments if a sediment spill occurs during transport along the Columbia River and during off-loading of the sediment at the Port of Morrow. NW Natural proposes conservation measures to reduce the risk of a spill. The risk is greatest during rain events when erosion control and spill prevention the measures are less effective.

Effects to Physical Habitat and Prey Base. Dredging and capping typically result in the short-term loss of benthic organisms and their habitat, but the sediments are so contaminated at this site that no benthic community exists. In fact, there may be an improvement to the benthic community if the organisms are able to recolonize the area once the surface contamination is removed and the area is capped.

The pelagic food web could also be affected by short-term (weeks to several months) increases in contaminant concentrations and increased turbidity during and following dredging activities. Laboratory studies have shown effects to *Daphnia pulex* after exposure to PAHs (Southworth *et al.* 1978) and effects to *Daphnia magna* after exposure to naphthalene (Whitman and Miller 1982). How these studies relate to the river environment and to invertebrate populations is not clear, but there is a risk of effects to pelagic invertebrates through increased exposure to contaminants. It is unlikely that changes in the pelagic community will be measurable because of flow induced movements of these animals, and their transient presence in the action area.

Ultimately the removal of the tar body from the sediment at the Gasco Site will reduce exposure of both benthic and pelagic prey species to contaminants, and could potentially benefit these species. Reduced chemical stress could boost productivity, and increase the size of populations in the Portland Harbor.

Effects on ESA-Listed Species. The action, as proposed, is reasonably likely to have the following temporary, detrimental effects to salmonids during project construction. The greatest risk to rearing or migrating salmonids is the suspension of contaminated sediments and increased release of contaminants during construction, and potential effects during handling. The analysis below includes both direct and indirect effects on ESA-listed species and their habitats.

Potential for Exposure. The presence/absence information for ESA-listed salmonids in the action area during the Willamette River summer in-water work window (July 1 to October 31) and winter in-water work window (December 1 to January 31) is presented in Table 5. It is unlikely that chum salmon would be adversely affected by the proposed action if work is conducted during the summer in-water work window. Juvenile chum salmon have left freshwater by late May. Although adult chum salmon begin to return in late September, the adults would normally not travel into the Willamette River. Barges moving through the Columbia River navigation channel would pass chum salmon spawning habitat when spawning could occur. No effects to chum spawning habitat are anticipated. If the proposed action is conducted during the summer in-water work window, no effects to chum salmon are anticipated because it is highly unlikely that they would be present in the Willamette River during that time. If, however, work is conducted during the winter in-water work window, then chum salmon juveniles may be present in the action area. Also, the range of chum salmon does not extend up to the Port of Morrow, the location of the off-loading facility.

It is also unlikely that sockeye salmon would be adversely affected by project activities. Sockeye salmon do not reside in the Willamette River, and adult sockeye salmon migrate upstream primarily in June and July (www.fpc.org, downloaded July 11, 2005). A few adult sockeye salmon may be present in September and October when off-loading will occur, but they will likely avoid the vicinity of the port. Juvenile sockeye salmon could be present in the off-loading area at the Port of Morrow in September and October. The number of juveniles is expected to be low because the peak migration period has passed and the abundance of sockeye salmon in the Columbia basin is low.

It is likely that steelhead will be present in the Willamette River and Columbia River during the summer and winter in-water work windows. Although the peak movement of both adults and juveniles is from late April through May, both adults and juveniles could be present during the in-water work windows in the Willamette River. It is likely that the UCR steelhead would have moved through the Columbia River before the planned September and October work period, but it is likely that MCR steelhead juveniles will be present.

Table 5. The presence/absence of ESA-listed salmonids in the action area (Willamette River or Columbia River) during the Willamette River summer in-water work window (July 1 to October 31) and winter in-water work window (December 1 to January 31). 'Y' indicates the ESU is present, 'Y'- indicates presence in very low numbers, 'N' indicates that the ESU is not likely to be present. (https://www.nwp.usace.army.mil/op/fishdata/AdultFishCounts/2004/2004_10.txt)

ESU	**Summer In-water Work Window**		**Winter In-water Work Window**	
	Adults	**Juveniles**	**Adults**	**Juveniles**
ESUs in both the Willamette River and Columbia River				
LCR Chinook salmon	Y	Y-	N	Y
UWR spring-run Chinook salmon	Y-	Y-	Y	Y
LCR coho salmon	Y	Y-	Y	Y-
LCR steelhead	Y-	Y-	N	Y
UWR steelhead	Y-	Y-	Y	Y
ESUs in the Columbia River (i.e., not in Willamette River)				
UCR spring-run Chinook salmon	Y	Y-	N	N
SR spring/summer run Chinook salmon	Y	Y-	N	N
SR fall-run Chinook salmon	Y	Y	Y-	N
CR chum salmon (below Bonneville Dam)	Y	N	Y	Y
SR sockeye salmon	Y	N	N	N
MCR steelhead	Y	Y	Y-	Y
UCR steelhead	N	Y	Y-	N
SRB steelhead	Y	Y	Y-	N

In the Willamette River, adult Chinook migrate in late spring or late summer depending on the ESU and the run. Likewise, juvenile Chinook salmon are likely to be found in the lower Willamette River throughout the year. Yearling and subyearling Chinook salmon are likely to spend a week or two in the lower Willamette River as they migrate and feed. Both adults and juveniles of the SR fall-run Chinook salmon ESUs and LCR Chinook salmon are likely to be present in the Columbia River during transport, and the SR Chinook salmon are likely to be present during off-loading of the contaminated sediments at the Port of Morrow. LCR Chinook spawn beside the Columbia River. The UCR spring-run and SR spring/summer run Chinook are not likely be present during the off-loading at the Port of Morrow.

LCR coho salmon would likely be present in the lower Willamette River during the summer and winter in-water work windows. The adults migrate from April and into July, and the juveniles migrate downriver from August through March. While summer is not the peak migration period for this ESU, they are likely to be present in low numbers.

Therefore, coho salmon, Chinook salmon, and steelhead ESUs are likely to present in the action area during the proposed summer and winter in-water work windows.

Direct Effects of Project Activities. Salmonids are likely to be directly affected by dredging and off-loading activities. Juveniles are more likely to be affected because they are less able to swim away from in-water disturbances, and they are more commonly found in shallow water where the majority of the dredging will occur. NW Natural and EPA will implement conservation measures at the dredge site to minimize the potential for effects; these include the deployment of a silt curtain system and the seining of fish to remove them from the project area. Working in the summer in-water work window when fish densities are lower will also reduce the potential for directs affects to listed salmonids. However, avoidance of the disturbance and being trapped in a seine would be an energetic cost to juvenile salmonids and an additional stressor beyond the existing baseline. Direct mortality could occur during seining, capture and handling, but is not reasonably likely.

Dredging operations are not expected to entrain juvenile salmonids. Dredging will only occur within a containment system where most fish will be excluded. Therefore the opportunity for entrainment will be greatly reduced. As well, pressure waves created as the bucket descends through the water column warns salmonids and gives them time to avoid the bucket. Even without fish exclusion, capture rates of salmonids by dredge buckets tend to be low based on studies in the Columbia River (Larson and Moehl 1990) and Grays Harbor (McGraw and Armstrong 1990).

Fish will be exposed to increased turbidity downstream of the dredging, even with the silt curtain in place. The effects of suspended sediment and turbidity on fish, as reported in the literature, range from beneficial to detrimental. Elevated TSS conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration. At concentrations of 53 to 92 parts per million (ppm) (24 hours) macroinvertebrate populations were reduced (Gammon 1970). Concentrations of 250 ppm (1 hour) caused a 95% reduction in feeding rates in juvenile coho salmon (Noggle 1978). Concentrations of 1200 ppm (96 hours) killed juvenile coho salmon (Noggle 1978). Concentrations of 53.5 ppm (12 hours) caused physiological stress and changes in behavior in coho salmon (Berg 1983). The proposed sediment removal action will result in increased turbidity in the Willamette River, despite the implementation of conservation measures such as a silt curtain. The temporary increase in turbidity and suspended solids will likely trigger similar responses to those listed above for UWR spring-run and LCR Chinook salmon, LCR and UWR steelhead, and LCR coho salmon.

Adult fish will likely be able to avoid the area. Juvenile salmon, which tend to move along the riverbank where the project will occur, are less able to avoid turbid waters. Therefore, some juvenile salmonids will likely be injured by the increased turbidity within the action area in the Willamette River. The effects will likely be increased physiological stress, reduced feeding, and change in behavior. Because the duration of the in-water portion of the proposed action is expected to be two months, and the spatial extent is small, the effect of increased turbidity at the population level or at the ESU scale is not expected to be measurable.

Effects of Contaminant Releases. The primary contaminants associated with the tar body are PAHs and benzene. Releases of others toxicants may occur, including copper, cyanide, ethylbenzene, and toluene.

According to the BA, various PAHs (anthracene, benzo(a)anthracene, benzo(a)pyrene, fluoranthene, fluorene, naphthalene, phenanthrene) have the potential to exceed acute or chronic water quality criteria down-current from the dredging activity. The silt curtain is expected to reduce the risk of exceeding criteria by 50%. Even with the silt curtain in place, there is a high risk that the proposed project will cause exceedances of water quality criteria outside of the containment area. These are likely to extend from the silt curtain, and downstream for several hundred feet. Any fish in the vicinity will be exposed to concentrations of contaminants that are likely to cause lethal and non-lethal effects.

The primary chemicals associated with the tar at the Gasco Site are PAHs and benzene. PAHs in water tend to adsorb to sediments either in the water column or in bottom sediments. This adsorption generally makes them less bioavailable via direct contact with organisms. However, a portion of these PAHs are likely bioavailable to benthic fish and invertebrates through direct contact and diet. PAHs are bioaccumulated in benthic invertebrates, and are passed to salmonids through the food chain (Meador *et al.* 1995). Fish feeding in the project area are likely to ingest contaminated invertebrates and incidentally ingest elevated levels of PAHs or other contaminants that have adsorbed to particles in the water column while feeding. PAHs are metabolized and detoxified in vertebrates such as fish, and therefore, not bioaccumulated (Varanasi *et al.* 1989). However, some intermediate metabolites of PAHs possess carcinogenic properties and cause other adverse effects in mammals and fish (Johnson 2000). Arkoosh *et al.* (1994) found that exposure to both PAHs and PCBs impaired immunity in juvenile fall Chinook salmon. Impaired immunity has been linked to increased susceptibility to disease and increased predation in the marine environment.

The risk of exposure is greatest if the silt curtain fails, an event that is more likely to occur at flows greater than 1 fps. Flows of that magnitude commonly occur in the winter, and could occur during larger summer storms. BMPs will be in place to halt work if the silt curtain fails.

Effects to water quality may occur in the Columbia River if a spill occurs during transport or during off-loading at the Port of Morrow. A spill of contaminated sediment is more likely in windy conditions, during rain events, or if the crane operator is not careful or tries to rush during off-loading. A spill of contaminated sediments would likely kill or injure listed salmonids.

Effects on Critical Habitat. Designated critical habitat within the action area for the ESA-listed salmonids considered in this Opinion consists of freshwater rearing sites and freshwater migration corridors and their essential physical and biological features as listed below. The effects of the proposed action on these features are summarized as a subset of the habitat-related effects of the action that were discussed more fully above. The water quality effects described will be short term (weeks) during in-water construction. Some long-term, beneficial effects will occur because a source of contamination will be removed.

Freshwater rearing sites
Water quantity – Project activities are not likely to affect water quantity or flows.
Floodplain connectivity – Floodplain connectivity is very poor in the project reach, and will not be changed by the proposed action.
Water quality – For two months while the tar body and contaminated sediments are being removed, there are likely to be toxic concentrations of PAHs and other parameters. However, over the long term (years), the proposed action will contribute to improved water quality because a source of contamination will be partly removed.
Forage – Dredging and sedimentation downstream of the project reach will reduce the diversity and abundance of aquatic insects and other invertebrate prey. Within a few months after project completion, the project reach is likely to return to pre-project densities of prey organisms and will likely improve because of improved sediment quality.
Natural cover – There is no natural cover at the site, and the proposed action will not change the availability of natural cover.

Freshwater migration corridors
Free passage – Passage will be impeded along the south bank of the Willamette River will be impeded by the presence of the silt curtain during September and October. Project effects are likely to delay migration over the short term (two months).
Water quantity – This will not be changed by the proposed action.
Water quality – Short-term increases in turbidity and contaminant concentrations are likely to impair or delay the movement of juvenile salmon through the project reach.
Natural cover – There is no natural cover in the project reach, and this will not be changed by the proposed action.

Freshwater spawning sites
Water quantity – This will not be changed by the proposed action.
Water quality – A spill of contaminated sediment (wind or rain induced) from the transport barge could negatively effect water quality in the Columbia River. CR chum salmon and LCR Chinook salmon spawn in or near the Columbia River. Because of the distance between the navigation channel and spawning habitat, and the potential for dilution by the river, it is unlikely that the proposed action will affect spawning habitat.
Substrate – This will not be changed by the proposed action.

Information presented in the status and baseline sections, above show that poor conditions for rearing and migration are significant factors for the affected ESUs. The effects of this action will lower the value of water quality, forage, and passage in the action area over the short term, but will not affect and may even improve the conservation value of the action area over the long term. The conservation value of the watershed for the ESU is already very low and has low potential for improvement, either naturally or through active restoration, because of the highly industrialized and contaminated nature of this portion of the watershed. The proposed action is part of a Federal, state, local and private effort to improve water and sediment quality in the Portland Harbor, and therefore the proposed action will contribute to an improvement in water quality PCEs in the lower Willamette River.

Cumulative Effects

'Cumulative effects' are those effects of future state or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation (50 CFR 402.02). Cumulative effects that reduce the capacity of ESA-listed ESUs to meet their biological requirements in the action area increase the risk to the ESU that the effects of the proposed action on the ESU or its habitat will result in jeopardy (NMFS 1999).

The NMFS is not aware of any specific future non-Federal activities within the action area that would cause greater impacts to listed species than presently occurs. Industrial activities will continue within the action area, as will efforts to remove or isolate contaminants in the Portland Harbor.

Between 1990 and 2000, the population of Multnomah County increased by 13.1%.[2] Thus, NMFS assumes that future private and state actions will continue within the action area, increasing as population density rises. As the human population in the action area continues to grow, demand for agricultural, commercial, or residential development is also likely to grow. The effects of new development caused by that demand are likely to further reduce the conservation value of the habitat within the action area.

Although quantifying an incremental change in survival for the ESUs and in the conservation role of critical habitat considered in this consultation due to cumulative effects is not possible, it is reasonably likely that those effects within the action area will have a long-term, negative, widespread effect on the likelihood that these ESUs will survive and recover, and a long-term, negative effect on the conservation role of critical habitat.

Synthesis of Effects

The NMFS identified fry and juvenile rearing and migration as primary limiting factors for the listed ESUs in this Opinion. Juvenile rearing and migration habitat is limited by poor water quality and degradation of physical habitat. In 2003, the Biological Recovery Team (BRT 2003) stated that the major risk factors remain, and most populations are at relatively low abundance. For LCR and UWR steelhead, the BRT found a moderate risk for all categories, including abundance, productivity, diversity and spatial structure (BRT 2003). The Willamette River is proposed for critical habitat for all LCR and UWR steelhead and UWR spring-run and LCR

[2] U.S. Census Bureau, State and County Quickfacts, Multnomah County, http://quickfacts.census.gov/qfd/

Chinook salmon, and rated as having ‘high’ conservation value, although present conditions are degraded due to urbanization and industrialization in the basin that have altered flows, degraded water quality, and reduced the complexity of the channel.

For ESA-listed salmonids in the Columbia River, abundance, productivity, diversity, and spatial structure remain impaired. The Columbia River is designated critical habitat for the two SR Chinook salmon ESUs and SR sockeye salmon, and is proposed critical habitat for the other ESUs. Present conditions are also impaired by altered flow, and changes to the water quality and physical habitat.

Negative effects to the ESUs and designated critical habitat, and the environmental baseline presented in the Opinion (fish handling, increased concentrations of contaminants and turbidity) will be short term and will not contribute to the long-term risk of extinction for each ESU or reduce the conservation value of designated critical habitat. A very small proportion of the total number of ESA-listed salmonids will be affected by the short-term adverse effects of the action on rearing and migratory conditions. This is because only a small portion of the ESUs would be present during the in-water work window. Those few fish will be exposed to additional stress cause primarily by reduced water quality, increased turbidity and impaired passage. Any stress experienced by those fish is likely to be brief (weeks) and limited to the project reach and several hundred feet downstream of the silt curtain, and the off-loading site at the Port of Morrow. A few other fish may be injured or killed by handling during removal from the containment area, or due to the culmination of joint causes, such as stress due to the action, a previous wound inflicted by the environmental baseline, and genetic weakness. The timing, frequency, intensity, and duration of these adverse effects will be not be felt by enough fish to produce an observable effect on the abundance, distribution, diversity, or productivity of these ESUs at either the population or ESU scale.

The adverse effects of the project on designated critical habitat PCEs will be short-term (weeks), and are not likely to reduce the conservation value of critical habitat at the watershed scale. The long-term (years to decades) effect of the proposed action on critical habitat PCEs is likely to be beneficial. Thus, the proposed action will increase the conservation value of critical habitat and complement other habitat improvements necessary to improve productivity of the entire freshwater life cycle.

Conclusion

After reviewing the status of ESA-listed salmonids, and their designated critical habitat, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, NMFS concludes that the action, as proposed, is not likely to jeopardize the continued existence of the ESA-listed salmonids and is not likely to destroy or adversely modify designated critical habitat.

Conservation Recommendations

Section 7 (a)(1) of the ESA directs Federal agencies to use their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of the threatened and endangered species. The following recommendation is a discretionary measure that NMFS believes is consistent with this obligation and therefore should be carried out by EPA:

> EPA should work with NW Natural to improve the quality of shallow water habitat as part of the final remedy for the site. The primary approach to accomplish this recommendation is through the restoration of an appropriate site in the Portland Harbor area that is, or could be, accessible to listed juvenile salmonids by contouring of the habitat, improving the substrate, and re-establishing more natural shoreline and bank conditions. Bioengineered alternatives along the shoreline are highly preferred over riprap alternatives.

Please notify NMFS if EPA carries out this recommendation so that we will be kept informed of actions that minimize or avoid adverse effects, and those that benefit species or their habitats.

Reinitiation of Consultation

Reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If the amount or extent of taking specified in the incidental take statement is exceeded; (b) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (c) if the identified action is subsequently modified in a manner that has an effect to the listed species or critical habitat that was not considered in the biological opinion; or (d) if a new species is listed or critical habitat designated that may be affected by the identified action (50 CFR 402.16).

This consultation expires two years from the date of issuance**.** To reinitiate consultation, contact the Oregon State Office Habitat Office of NMFS and refer to NMFS No.: 2005/03253.

Incidental Take Statement

Section 9(a)(1) of the ESA prohibits the taking of listed species without a specific permit or exemption. Protective regulations adopted pursuant to Section 4(d) extend the prohibition to threatened species. Among other things, an action that harasses, wounds, or kills an individual of a listed species or harms a species by altering habitat in a way that significantly impairs its essential behavioral patterns is a taking (50 CFR 222.102). Incidental take refers to takings that result from, but are not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant (50 CFR 402.02). Section 7(o)(2) exempts any taking that meets the terms and conditions of a written incidental take statement from the taking prohibition.

Amount or Extent of Take

Activities necessary to complete the proposed sediment removal action will take place in riparian and benthic areas within the active stream channel of Willamette River and the Columbia River when individuals of LCR Chinook salmon, UWR spring-run Chinook salmon, CR chum salmon, LCR steelhead, UWR steelhead, LCR coho salmon, UCR Chinook salmon, SR spring/summer run Chinook salmon, SR fall-run Chinook salmon, UCR steelhead, MCR steelhead, and SRB steelhead are likely to be present. Incidental take caused by adverse effects of those actions will include the following: (1) Capture of juvenile fish during work area isolation, some of which will be injured or killed; and (2) an increase in PAHs and other contaminants and turbidity due to removal of contaminated sediments that will harass or kill juvenile and adult fish in the action area, and will likely cause them to avoid the project vicinity during project activities.

The NMFS anticipates that up to 50 juvenile and 5 adult individuals of the ESUs considered in the consultation will be captured, injured, or killed due to work necessary to isolate the in-water construction area. Because the individual juvenile fish that are likely to be captured, injured or killed by this action are from different ESUs that are similar to each other in appearance and life history, and to unlisted species that occupy the same area, assigning this take to individual ESUs is not possible. The adult fish could be UWR spring-run or LCR Chinook salmon, UWR or LCR steelhead or LCR coho salmon.

Take caused by the contaminant and turbidity exposure cannot be accurately quantified as a number of fish because the relationship between contaminant concentrations and effects, as well the distribution and abundance of listed salmonids in the action area, is imprecise. In such circumstances, NMFS uses the causal link established between the activity and a change in habitat conditions (such as water quality) affecting the species to describe the extent of take as a numerical level of habitat disturbance.

Here, the best available indicator for the extent of take is the area and volume of benthic habitat that will be modified by the action because those variables are directly proportional to harm attributable to this project - removal of 20,000 square feet of freshwater rearing and migration habitat containing 16,000 cy of tar material and contaminated sediment. In the accompanying Opinion, NMFS determined that the level of incidental take associated with this activity is not likely to result in jeopardy to the species. Moreover, the habitat that will be affected is extremely poor quality because of the existing level of contamination, and is not limited at the site-specific or watershed scale.

The estimated number of fish to be captured, injured, or killed during work area isolation (50 juvenile and 5 adult individuals of the ESUs considered in the consultation) and the amount of contaminated sediment that will be removed by dredging (20,000 square feet of freshwater rearing and migration habitat containing 16,000 cy of tar material and contaminated sediment) are thresholds for reinitiating consultation. Exceeding any of these limits will trigger the reinitiation provisions of this Opinion.

Reasonable and Prudent Measures

Reasonable and prudent measures are nondiscretionary measures to avoid or minimize take that must be carried out by cooperators for the exemption in Section 7(o)(2) to apply. EPA has the continuing duty to regulate the activities covered in this incidental take statement where discretionary Federal involvement or control over the action has been retained or is authorized by law. The protective coverage of Section 7(o)(2) may lapse if EPA fails to exercise its discretion to require adherence to terms and conditions of the incidental take statement, or to exercise that discretion as necessary to retain the oversight to ensure compliance with these terms and conditions. Similarly, if any applicant fails to act in accordance with the terms and conditions of the incidental take statement, protective coverage may lapse.
The NMFS believes that full application of conservation measures included as part of the proposed action, together with use of the reasonable and prudent measures and terms and conditions described below, are necessary and appropriate to minimize the likelihood of incidental take of ESA-listed species due to completion of the proposed action.

EPA shall:

1. Minimize incidental take from in-water work by limiting the timing of in-water work.
2. Minimize incidental take from in-water work by modifying project activities to reduce the opportunity for fish exposure to contaminants.
3. Minimize incidental take from project implementation by ensuring effective project management, monitoring, and reporting.

Terms and Conditions

To be exempt from the prohibitions of Section 9 of the ESA, EPA and its cooperators, including the applicant, if any, must fully comply with conservation measures described as part of the proposed action and the following terms and conditions that implement the reasonable and prudent measures described above. Partial compliance with these terms and conditions may invalidate this take exemption, result in more take than anticipated, and lead NMFS to a different conclusion regarding whether the proposed action will result in jeopardy or the destruction or adverse modification of critical habitats.

1. To implement Reasonable and Prudent Measure #1 (timing of in-water work), EPA shall ensure that the applicant will only conduct in-water activities during the summer in-water work window of July 1, through October 31, 2005, when fish densities are lower and the likelihood of maintaining the integrity of the silt curtain/containment system is greater because of lower flows. If work cannot be completed during the summer in-water work window, EPA and the applicant will place a temporary cap over the site before the end of the work window, to reduce the opportunity of contaminant exposure over the winter.

2. To implement Reasonable and Prudent Measure #2 (reduce exposure to contaminants), EPA shall ensure that:

   a. Silt Curtain/Containment. If the silt curtain fails during dredging or removal activities (curtain cannot be deployed as described in the BA or fails to meet the water quality criteria), the dredging activities must stop until the silt curtain is properly deployed or an alternative containment system can be implemented. NMFS must be contacted before the implementation of an alternative system of containment. Divers shall inspect the silt curtain weekly to check for breaches. No dredging shall occur when the silt curtain is not in place, or when the silt curtain door is opened.
   b. Dredging. The dredge bucket will not be dragged across the bottom of the river and the dredge bucket will not be allowed to swing while under water.
   c. Off-Loading from the Barge. If water quality criteria (including turbidity) are exceeded during de-watering the sediment and off-loading the sediment at the Port of Morrow, then project activities shall cease until new methods of containment are developed and implemented. If measures are not successful for more than two barges, then all subsequent barges shall not filled past 80% capacity.
   d. Discharge of Water from the Barge. If water quality criteria are exceeded downstream of the silt curtain, EPA will halt the discharge of water from the barge into the silt curtain/containment system. This water shall be placed into NW Natural's on-site treatment system or treated for disposal to the sanitary system.
   e. Transfer and Transport. The drying reagent (when not in use), excavated sediment and treated sediment shall be covered during stockpiling and transport to prevent releases from wind or rain.
   f. Removal of Containment System. The silt curtain removal shall occur during the summer in-water work window, and shall be done slowly and with caution to minimize the release of contaminated materials trapped by the curtain.
   g. Water Quality Sampling. Water quality monitoring will be collected during active dredging operations. If two consecutive exceedances occur, all dredging must stop until the source of the exceedances is controlled.

3. To implement Reasonable and Prudent Measure #3 (monitoring), EPA shall ensure that:

   a. Salvage Notice. If a sick, injured or dead specimen of a threatened or endangered species is found, the finder must notify NMFS Law Enforcement at 1-800-853-1964. The finder must take care in handling of sick or injured specimens to ensure effective treatment, and in handling dead specimens to preserve biological material in the best possible condition for later analysis of cause of death. The finder also has the responsibility to carry out instructions provided by Law Enforcement to ensure that evidence intrinsic to the specimen is not disturbed unnecessarily.

b. Project Completion Report or Memo To File. Ensure that within 60 days of finishing work below ordinary high water, EPA will submit a project completion memo to the NMFS Oregon State Habitat Office with the following information:

i. Start and end dates for work completed.

ii. The following data.

1. Work cessation. Dates, if any, that work ceased due to high flows or silt curtain disruptions.[3]
2. Pollution control. A summary of pollution and erosion control inspections, including any turbidity control failure or water quality exceedances, contaminant release, and correction effort, and any relevant information concerning the deployment of the bubble curtain that would make deployment easier for future actions.
3. In-water work days. Total number of days of in-water work.
4. Turbidity. A summary of turbidity measurements and any action taken based on those measurements.
5. Contaminants. Results of the water quality monitoring, including a map(s) of the sampling site.
6. Benthic disturbance. Area of benthic habitat disturbed; volume of contaminated sediment removed.

MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The consultation requirements of Section 305(b) of the MSA directs Federal agencies to consult with NMFS on all actions, or proposed actions, that may adversely affect EFH. Adverse effects include the direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside EFH, and may include site-specific or EFH-wide impacts, including individual, cumulative, or synergistic consequences of actions (50 CFR 600.810). Section 305(b) also requires NMFS to recommend measures that may be taken by the action agency to conserve EFH.

The Pacific Fishery Management Council (PFMC) designated EFH for groundfish (PFMC 1998a), coastal pelagic species (PFMC 1998b), and Chinook salmon, coho salmon, and Puget Sound pink salmon (PFMC 1999). The proposed action and action area for this consultation are described in the Introduction to this document. The action area includes areas designated as EFH for various life-history stages of starry flounder (PFMC 1998), and coho and Chinook salmon (PFMC 1999).

Based on information provided in the BA and the analysis of effects presented in the ESA portion of this document, NMFS concludes that proposed action will have the following adverse

[3] 'High flows' means any flow that makes the silt curtain ineffective at maintaining a barrier around the dredge area.

effects on EFH designated for starry flounder, and coho and Chinook salmon: Increased turbidity and concentrations of contaminants during the sediment removal action.

EFH Conservation Recommendations

The NMFS believes that the following six conservation measures are necessary to avoid, mitigate, or offset the impact of the proposed action on EFH.

1. Silt Curtain/Containment. If the silt curtain fails during dredging or removal activities (curtain cannot be deployed as described in the BA or fails to meet the water quality criteria), stop dredging activities until the silt curtain is properly deployed or an alternative containment system can be implemented. Contact NMFS before the implementation of an alternative system of containment. Inspect the silt curtain weekly using divers to check for breaches. Do not dredge when the silt curtain is not in place, or when the silt curtain door is opened.
2. Dredging. Do not drag the dredge bucket across the bottom of the river or allow the dredge bucket to swing while under water.
3. Off-Loading from the Barge. If water quality criteria (including turbidity) are exceeded during de-watering the sediment and off-loading the sediment at the Port of Morrow, then cease project activities until new methods of containment are developed and implemented. If measures are not successful for more than two barges, then do not fill all subsequent barges past 80% capacity.
4. Discharge of Water from the Barge. If water quality criteria are exceeded downstream of the silt curtain, EPA do not discharge water from the barge into the silt curtain/containment system. Place this water into NW Natural's on site treatment system or treated for disposal to the sanitary system.
5. Transfer and Transport. Cover the drying reagent (when not in use), excavated sediment, and treated sediment during stockpiling and transport to prevent releases from wind or rain.
6. Removal of Containment System. Remove the silt curtain during the summer in-water work window slowly and with caution to minimize the release of contaminated materials trapped by the curtain.
7. Water Quality Sampling. Collect water quality monitoring during active dredging operations. If two consecutive exceedances occur, stop all dredging until the source of the exceedances is controlled.

Statutory Response Requirement

Federal agencies are required to provide a detailed written response to NMFS' EFH conservation recommendations within 30 days of receipt of these recommendations [50 CFR 600.920(j)(1)]. The response must include a description of measures proposed to avoid, mitigate, or offset the adverse affects of the activity on EFH. If the response is inconsistent with the EFH conservation recommendations, the response must explain the reasons for not following the recommendations, including the scientific justification for any disagreements over the anticipated effects of the proposed action and the measures needed to avoid, minimize, mitigate, or offset such effects.

In response to increased oversight of overall EFH program effectiveness by the Office of Management and Budget, NMFS established a quarterly reporting requirement to determine how many conservation recommendations are provided as part of each EFH consultation and how many are adopted by the action agency. Therefore, in your statutory reply to the EFH portion of this consultation, we ask that you clearly identify the number of conservation recommendations accepted.

Supplemental Consultation

EPA must reinitiate EFH consultation with NMFS if the proposed action is substantially revised in a way that may adversely affect EFH, or if new information becomes available that affects the basis for NMFS' EFH conservation recommendations [50 CFR 600.920(k)].

DATA QUALITY ACT DOCUMENTATION AND PRE-DISSEMINATION REVIEW

Section 515 of the Treasury and General Government Appropriations Act of 2001 (Public Law 106-554) (Data Quality Act) specifies three components contributing to the quality of a document. They are utility, integrity, and objectivity. This section of the Biological Opinion addresses these Data Quality Act (DQA) components, documents compliance with the DQA, and certifies that this Opinion has undergone pre-dissemination review.

Utility: Utility principally refers to ensuring that the information contained in this consultation is helpful, serviceable, and beneficial to the intended users.

This ESA consultation concludes that the proposed activities to remove contaminated sediment and place a pilot cap at NW Natural's Gasco Site in Portland Harbor will not jeopardize the affected ESUs. Therefore, EPA can authorize this action in accordance with the CERCLA. The intended users are EPA, NW Natural, and river users in the Portland Harbor.

Individual copies were provided to the above-listed entities. This consultation will be posted on the NMFS Northwest Region website (http://www.nwr.noaa.gov). The format and naming adheres to conventional standards for style.

Integrity: This consultation was completed on a computer system managed by NMFS in accordance with relevant information technology security policies and standards set out in Appendix III, 'Security of Automated Information Resources,' Office of Management and Budget Circular A-130; the Computer Security Act; and the Government Information Security Reform Act.

Objectivity:

Information Product Category: Natural Resource Plan.

Standards: This consultation and supporting documents are clear, concise, complete, and unbiased; and were developed using commonly accepted scientific research methods. They adhere to published standards including the NMFS ESA Consultation Handbook, ESA Regulations, 50 CFR 402.01, *et seq.,* and the MSA implementing regulations regarding EFH, 50 CFR 600.920(j).

Best Available Information: This consultation and supporting documents use the best available information, as referenced in the Literature Cited section. The analyses in this Opinion/EFH consultation contain more background on information sources and quality.

Referencing: All supporting materials, information, data and analyses are properly referenced, consistent with standard scientific referencing style.

Review Process: This consultation was drafted by NMFS staff with training in ESA and MSA implementation, and reviewed in accordance with Northwest Region ESA quality control and assurance processes.

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